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I.

WOOD'S METAL CASTS OF THE EAR.

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Casts made of the cavities of the middle and internal ear offer the best means for studying the anatomy of these parts of the organ of hearing, especially in reference to the shape of these cavities and their relation to each other. Very little use has been made in this country of such casts for teaching the anatomy of the ear.

The object of this paper is to call attention to the value of such preparations and to describe the methods by which they can be made.

Bezold was the first to elaborate the making of casts and to apply it to the study of the anatomy of the ear in its relations to practical otology, although such casts had for many years been used by anatomists. Hyrtl used this method ex-

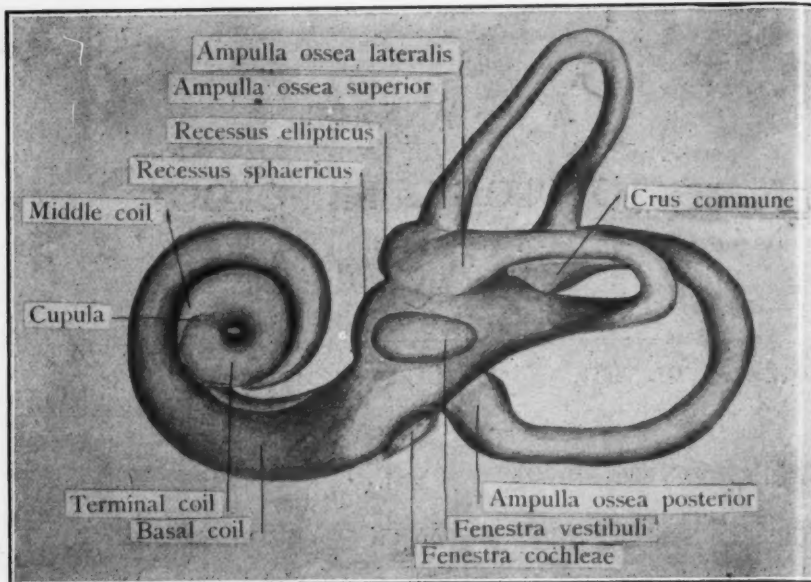


Fig. 1.

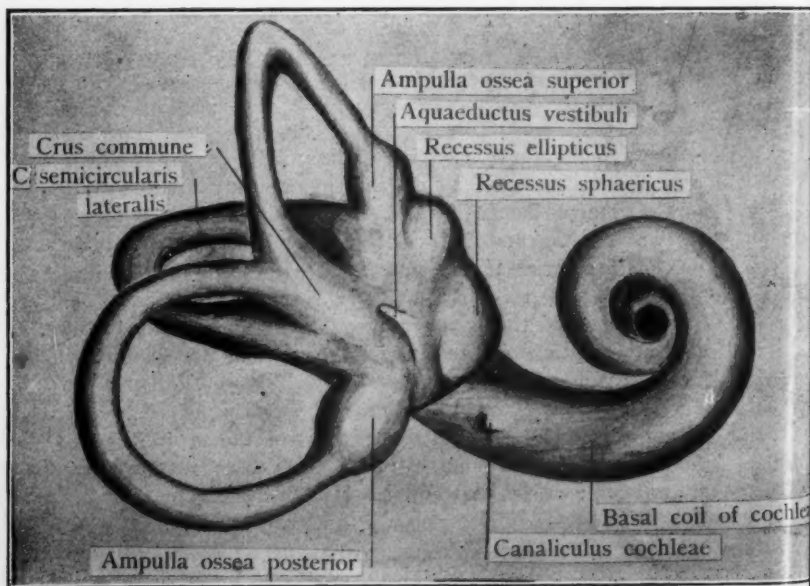


Fig. 2.

tensively in the study of the comparative anatomy of the osseous labyrinth of vertebrates. Bezold states that the first casts of the osseous labyrinth were made as early as 1827 in the laboratory of A. Meckel. In more recent years Siebenmann has made use of this method in a detailed study of the osseous labyrinth

Wax was used by Bezold in making corrosion casts of the ear. Wood's metal has been used in recent years and makes much better casts, as it is more durable and the casts can be handled without so much danger of injuring them.*

Casts may be made of the osseous labyrinth alone, of the osseous labyrinth and the middle ear cavities, or of the middle ear cavities alone.

In making casts of the osseous labyrinth alone, the following method may be used. In a dry temporal bone having all the soft parts removed a horizontal incision is made with a jeweler's saw, removing the squamous portion rising above the upper border of the petrous bone. A second incision is made with the saw through the *cavum tympani* removing the *meatus auditorius externus*. An opening is made with a file into the superior semicircular canal on the upper surface of the petrous bone. A small piece of cotton is laid over this opening and held in place with adhesive plaster. The *meatus acusticus internus* and the *fenestra cochleae* are closed in the same way. A small piece of glass tubing with a tapering end is inserted into the *fenestra vestibuli* and held in place preferably by means of a piece of modelling clay. The whole preparation is then embedded in plaster of Paris. This can best be done by taking a small pasteboard box large enough for the bone to lie in while the glass tube alone projects above the top. The bone is placed in the box, care being taken that the glass tube is protected with a plug of cotton and allowed to project above the top of the box. The plaster of Paris is mixed not too thin and

*Celloidin casts can also be made of the labyrinth. Such casts afford a very useful means for studying the blood-vessels in the labyrinth, see "The Distribution of Blood-vessels in the Labyrinth of the Ear," by Geo. E. Shambaugh, University of Chicago Press. 1903.

poured into the box until the bone is completely covered. After the plaster has set, the box is removed and when the plaster cast is thoroughly dried the preparation is heated before pouring in the Wood's metal. The heating of the preparation is best done by burying it in sand, allowing the glass tube to project, and placing it over a water bath for several hours. This method assures the thorough heating of

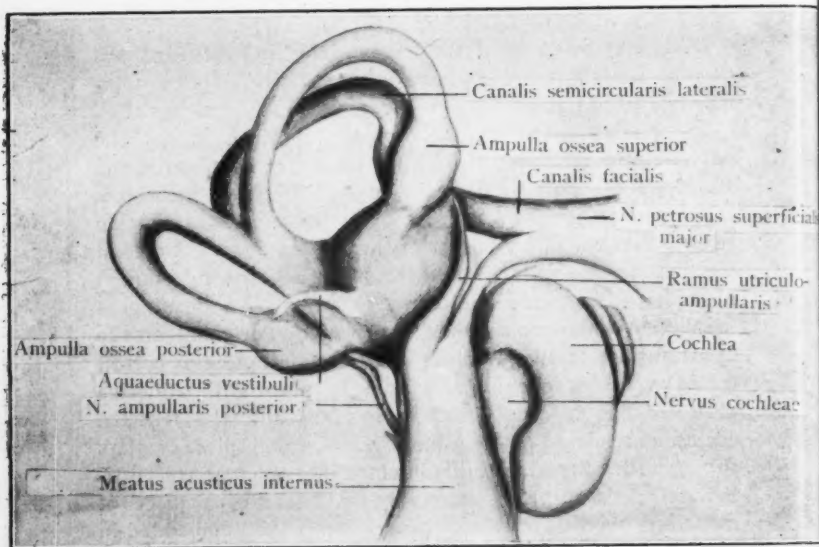


Fig. 3.

the preparation while there is no risk of getting the bone too hot since the temperature cannot arise above 100° Centigrade. The preparation is removed from the sand and the metal poured into the glass funnel. The object may be tapped gently against the table until the metal in the glass tube remains stationary indicating that all of the cavities of the labyrinth are filled. When cooled the plaster of Paris can be broken off, and the temporal bone having the osseous labyrinth filled with the Wood's metal placed in a glass dish

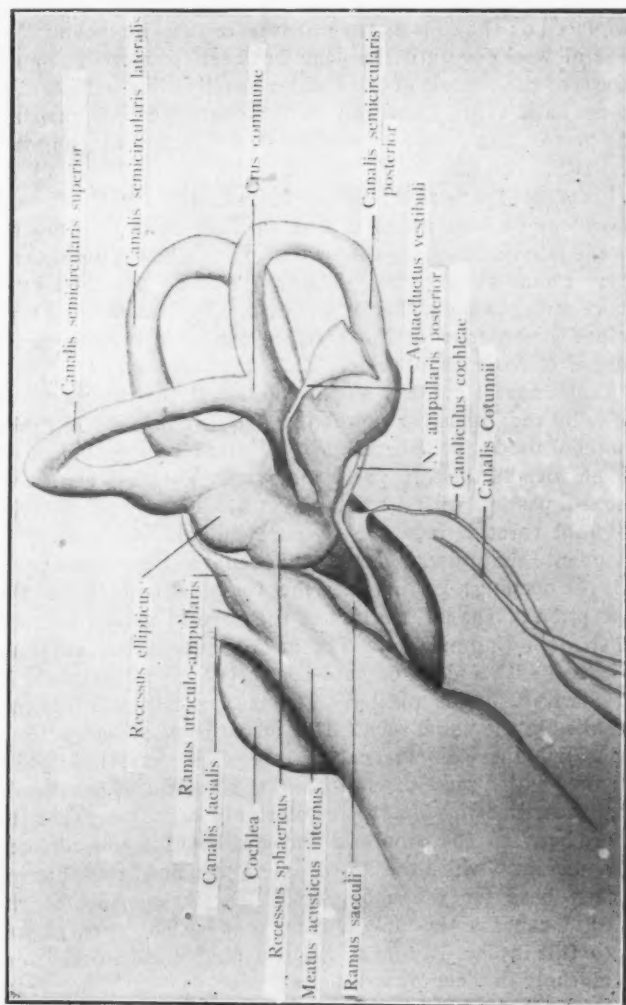


Fig. 4.

containing a 20 per cent. solution of KOH. The dish can be placed on the coils of the radiator or in a thermostat for several weeks or until the bone has been dissolved. Small pieces of the capsule of the cochlea usually cling persistently to the basal coil. These can often be removed by immersing the preparation for a few minutes in a solution of commercial HCl.

Casts of the osseous labyrinth intended for class-room work may be mounted on a card with an enlarged drawing of the labyrinth having the several parts labelled with their correct anatomical terms. The cast may be attached by a short string to one corner of the card. Figures 1 and 2 represent the anterior and posterior views of a Wood's metal cast of the osseous labyrinth labelled in this way.

Casts may be made of all the cavities of the dry temporal bone by the following method, which is adapted from the method used by Siebenmann. A dried temporal bone is taken with all the soft parts removed. The first step is to make a passage with a small gimlet from the canal for the internal carotid into the *cavum tympani*. An opening is made into the superior semicircular canal as described above. All the openings leading into the temporal bone with the exception of the inner orifice of the carotid canal are closed in the following manner: The *meatus auditorius externus* is closed with a piece of card-board cut to fit and held in place with adhesive plaster. The *meatus acusticus internus* is closed in the same way. The whole base of the petrous bone including the external surface of the carotid canal is covered with a piece of card-board cut to fit and held firmly in place with strips of adhesive plaster in such a way that the space between the bone and the card-board forms a closed chamber into which the Wood's metal can flow, thus forming a firm base for the entire cast. The inner orifice of the carotid canal is the only opening that has not been closed. Into this is placed a funnel made of pliable card-board, and held firmly in place by strips of adhesive plaster. The preparation is then embedded in plaster of Paris as above. Half of a small cigar box with the lid tacked shut forms the best receptacle for the plaster of Paris. The preparation is heated and the metal poured in through the paper funnel exactly as

in making the cast of the osseous labyrinth. The subsequent treatment in removing the plaster of Paris and dissolving away the bone has been described above.

These casts of all the cavities of the temporal bone are most instructive. The relations of the several parts of the osseous labyrinth to the middle ear structures are clearly shown, as well as the several divisions of the auditory nerve, the aquaeductus vestibuli, the aquaeductus cochleae, the canalis Cotunnii, and the relation of the facial nerve with the nervus petrosus superficialis major. These structures are represented in Figures 3 and 4 which are detailed sketches from casts of the whole temporal bone.

II.

SYPHILIS OF THE CARTILAGINOUS SEPTUM.

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The quadrangular cartilage of the nose is to be regarded as one of the least common sites of tertiary syphilis, in marked contrast to the frequency with which the adjacent tissues are involved. The gumma, which exhibits a predilection for the ethmoidal plate, and leads to such extensive destruction, effects the cartilage primarily with great rarity, so that an observer in the consideration of a septal perforation, is influenced largely by its situation, in forming a conclusion as to its syphilitic or non-syphilitic nature.

The object of the following paper is to describe a series of cases of tertiary syphilis, in which the quadrangular cartilage was alone or chiefly involved.

The conditions encountered may be divided as follows:

1. Superficial infiltration and ulceration of the mucous membrane covering the quadrangular cartilage.
2. Deep infiltration and necrosis of the mucous membrane of the cartilage.
3. Granulomatous growths arising from the anterior septal mucous membrane in syphilitic individuals.
4. Excoriations and scars of the anterior septal mucous membrane, occurring in syphilitic individuals.

1. Superficial Infiltration and Ulceration of the Anterior Septal Mucous Membrane.

Case 1. The patient, a man 35 years of age, came in November, 1903, for blocking of the nose of four months duration. The obstruction had progressively increased, and during the last two months, had been attended by blowing of crusts from the left side. The patient admitted having had gonorrhea about ten years ago, but no history of syph-

ilis could be obtained. Examination of the nose, showed on the left side of the septum anteriorly, a superficial excavation in the mucous membrane, filled with large, greenish crusts, on removal of which a rough, reddened, granular floor was disclosed, surrounded by an irregular, sharply-cut margin, slightly elevated, above its periphery. The elevated margin was moderately firm on pressure, and bled easily on its concave, inner aspect. The floor of this excavation was formed by the cartilage of the septum, which seemed slightly thinned in its center. The margins of the excavation passed with a gentle slope into mucous membrane of normal appearance. The right side of the septum was covered by normal-looking mucous membrane.

A diagnosis was made of a late syphilitic lesion, and the patient was referred to his family physician, with directions for appropriate general treatment. The latter reported to me two months later that the ulcerated process of the septum had markedly improved, and that the patient was breathing easily through the nose.

2. *Deep Infiltration of the Septal Mucous Membrane.*

CASE 2. A woman 35 years of age, always in previous good health, married, no children, but no miscarriages, was referred to me by Dr. E. H. Stevens November 1st, 1898, for a progressively increasing bilateral nasal occlusion, first noticed eleven months ago. Examination showed both lower turbinates to be greatly enlarged, the right in contact with the septum, of firm consistence, shrinking but slightly under cocain, and with a pale smooth surface. Eleven days later the right side of the nose externally was seen to have become somewhat swollen over an area 2 cms. in diameter, just anterior to the nasal bone, corresponding to an intranasal swelling on the right side of the cartilaginous septum high up. This septal swelling was firm, covered with a slightly wrinkled mucous membrane of normal color, and passed gradually into the surrounding normal tissue of the septum. A portion of this swelling was removed, together with a part of the right lower turbinate.

Microscopic examination of the specimen from the septum showed the following appearances. The specimen,

which is about 4 mms. thick, is covered by columnar, ciliated epithelium, in the interspaces of which are numerous polynuclear neutrophils. The mucosa is infiltrated with lymphoid cells, plasma cells, and hyaline degenerated cells. The submucous connective tissue is traversed by numerous new-formed blood vessels, lined with swollen endothelial cells. The cells of the connective tissue are seen to be actively proliferating. The mucous glands are numerous and vary considerably in size, many of them appearing much reduced in size, the glandular epithelium atrophied and shrunken, the nuclei of the latter frequently exhibiting fragmentation. The cytoplasm of the glandular cells is in some places swollen, occluding the lumen of the gland, in other places, it shows a granular degeneration. In the deeper portion of the connective tissue there is an irregular development of new-formed connective tissue and blood vessels surrounding the glands, which are here in a more advanced state of degeneration and atrophy, many of their nuclei having entirely disappeared, and the site of the gland indicated merely by the occurrence of fine granular cytoplasm without limiting cell walls, containing in its center from six to ten large vesicular nuclei. The connective tissue in this region is infiltrated with a compact aggregation of lymphoid cells, plasma cells, endothelial cells, with here and there a giant cell. In the center of the infiltrated regions are numerous areas of necrosis with irregularly divided outlines, in many places coalescing with each other. In these necrosed areas there are no infiltrating cells visible, but here and there a giant cell, often more or less disintegrated. These necrosed areas are situated chiefly in the deeper portions of the tissue near the cut surface.

The patient was given mercury and iodid of potash with the result of a prompt diminution in the size of the swelling in the right side. The septum healed over in a few weeks leaving a smooth surface, although the ulceration in the right lower turbinate lasted for several months, finally healing after the exfoliation of a small bony sequestrum.

Examination of the patient three months later showed a smooth mucous membrane covering the septum on both sides and giving no indication of a previous inflammatory process

beyond a small white scar corresponding to the point where the specimen had been removed for microscopic examination.

CASE 3. The patient, a young man 25 years of age, came to the throat clinic at the Massachusetts General Hospital, complaining of occlusion of the right nostril of several weeks duration.

Examination showed a reddish, rounded swelling, situated in the center of the quadrangular cartilage about the size of a split pea, covered with a smooth mucous membrane except toward the center, where a limited area of ulceration was evident. The whole mass was excised, together with a portion of the adjacent mucous membrane.

Histologic examination of the mass showed it to consist of a collection of infiltrating cells, surrounded by essentially normal mucous membrane. Proceeding from the former, in the direction of the tumor, we find the periphery of the latter to be marked by an infiltration, chiefly of lymphoid and plasma cells in the connective tissue, below the mucous membrane, particularly about the glands. With these there are associated a varying number of mast-cells, which are, however, nowhere numerous. At the periphery of the infiltration, there is evident also a proliferation of endothelial cells of the blood vessels, which appear in places to present a thickening of their intima. The mucous glands about the margin of the infiltration show proliferation of their cells, and are filled with mucus. In the infiltrated area, the lumen of the gland is compressed, the cells are inactive, and show no secretion of mucus. As the infiltration becomes more dense, the glands appear correspondingly diminished in size from pressure of the surrounding cells. Toward the center of the infiltration, the character of the cells change, polynuclear leucocytes appearing, the plasma cells and lymphoid cells becoming less abundant. Fragmentation of the nuclei of the endothelial and glandular cells appears, and becomes gradually more pronounced. The center of the mass itself is made up of necrotic cells, appearing as amorphous detritus, and nuclear fragments of varying size. The epithelium covering the tumor is of the columnar ciliated type, which shows a marked infiltration and as the center is approached it becom-

es exfoliated in irregular masses leaving the bare connective tissue, with its infiltrating cells. At the central ulceration, the necrotic area reaches the surface, for a short distance, and amorphous detritus is seen to be making its exit through the uppermost cell layers.

3. Granulomatous Growths Arising from the Anterior Septal Mucous Membrane.

CASE 4. The patient, a married woman 35 years of age, was referred to me by Dr. Prevaux of Haverhill. Examination showed extensive irregular ulcerations with cicatricial deformities over the hard palate and pharynx. A soft, friable, grayish-red mass with broad pedicle was situated on the left side of the septum anteriorly. The mass was excised close to the cartilage, which exhibited no loss or perceptible thinning at any point. The patient was put on mercury and iodid of potassium, with the result that the ulcerations in the throat rapidly improved.

Histologic examination showed the excised mass to consist essentially of granulation tissue, covered irregularly by mucous membrane. In the deeper portions of the mass there is an active proliferation of the connective tissue and of the endothelial cells of the part. There are numerous large thin-walled blood vessels, which show a marked proliferation of their endothelial lining. Scattered about in this region are a few giant cells surrounded by a heap of endothelial and epithelioid cells. Toward the periphery of the growth the blood vessels become numerous and exhibit more or less thickening of their adventitia. In places the vessels are dilated, forming large irregular sinuses. The proliferation of the endothelial and connective tissue cells is here more marked than in the deeper portions. The epithelium is extremely irregular in its distribution, being in places absent, in others greatly thickened, sending down long irregular interpapillary prolongations composed of actively proliferating cells. The meshes of the epithelium are more or less widely dilated, and contain numerous lymphoid and plasma cells and polynuclear leucocytes. No glands were found in the specimen.

It is evident that we have to do in this case with an active proliferation of the endothelial cells and of the connective

tissue, which is traversed by numerous new-formed blood vessels. Giant cells, and aggregations of epithelioid cells are comparatively few, and there is nowhere evident a formation of typical miliary tubercles. The histologic diagnosis is therefore syphilitic granuloma.

CASE 5. The patient was a married woman about 35 years of age, with negative previous history, who presented herself for a blocking of the left nostril of several weeks duration. The throat had been sore for several weeks previously, and had been treated by her physician with local applications of iodid of potash internally without effect.

Examination showed the posterior pharyngeal wall to be covered with a broad, irregular, shallow ulcer, with slightly elevated, undermined margins, and a granular floor, which in places appeared irregularly wrinkled and contracted. The right nostril presented a moderate deviation of the septum. On the left side of the septum anteriorly there was a short, rounded reddish mass, about one centimeter in transverse diameter, with a granular, easily bleeding surface, attached by a broad pedicle. This was removed and examined microscopically.

Histologic examination of the specimen removed from the septum showed it to consist chiefly of a reticulum of fibrous tissue, moderately vascular, containing numerous round cells, and covered by stratified pavement epithelium. The epithelium is in places deficient, in others, peculiar in thickness and distribution. Over a portion of the mass, the mucous membrane is thick and compact, consisting of 10 to 20 layers of epithelial cells, with well developed papilli. In other places, it is reduced to three or four layers of loosely coherent epithelial cells. Below the mucous membrane, the connective seems to be traversed by numerous thin-walled blood vessels. The connective tissue exhibits a marked proliferation of its cells, which are evenly distributed throughout the whole area. There is also a proliferation of the endothelial cells of the blood vessels, but these are nowhere aggregated into groups. In the meshes of the connective tissue there are lymphoid cells and plasma cells, more or less evenly distributed throughout the whole area. The inter-papillary prolongations of the epithelium in places extend

downward for a considerable distance from the surface, and the individual epithelial cells show an active mitosis.

No giant cells or glands are found in the tissue.

The tissue thus seems to consist essentially of actively proliferating connective tissue, supplied with thin-walled blood vessels and covered with proliferating pavement epithelium.

There is no evidence of central softening in the tumor.

4. Excoriations and Scars occurring in Syphilitic Individuals.

CASE 6. The patient, a man 50 years of age, was seen for blocking of the nose, due to the accumulation of dry crusts on the mucous membrane of the septum, which had been troubling him for eight or ten years. The patient admitted the possibility of an old syphilitic infection, but was unable to give definite details in regard to characteristic symptoms.

Examination of the nose showed a general thickening of the septum, with an irregular, granular area, on the left side, from which a large firmly adherent crust was removed with difficulty. The cartilaginous septum as a whole, presented an irregular thickening, with suggestions in the vicinity of the excoriation of irregular scar formation. From the patient's general symptoms, a diagnosis of probable late syphilis was made. Dr. Pfaff, who saw the patient subsequently, for symptoms of gastric disturbance made independently also a diagnosis of late syphilis. The patient was given iodid of potash, which relieved promptly his headache, and general depression. Four months later, examination of the nose showed a noticeable diminution in the extent of the excoriation, although the crusts continued to form to a moderate extent.

CASE 7. The patient, a man 35 years of age, came for a crust formation on the left side of the septum, which had troubled him for 5 or 6 years. The probability of an old syphilitic infection was admitted, but no definite history elicited.

Examination of the nose showed a slight general thickening of the cartilaginous septum, particularly on the left side. Anteriorly, an oval, irregularly outlined area was seen, which exhibited a rough granular floor, surrounded by mucous membrane, of normal appearance. The floor of the ulceration

was apparently composed of the perichondrium of the septum, which exhibited no thinning at this point, with here and there irregular strands and islands of cicatricial tissue extending from the periphery.

The cases described under the first two headings, namely, superficial and deep gummatous infiltration, represent well defined and well-known types of syphilitic infection. They correspond to the cutaneous and subcutaneous gumma respectively. In the first class, the infiltration is superficial, and epithelial necrosis occurs early. In the second group, the infiltration begins in the sub-mucous tissue, and a tumor of considerable size is formed, covered by a smooth mucous membrane, which only later exhibits ulceration. In none of these cases, was an invasion of the cartilage observed of any extent, and we must therefore consider that the perichondrium was only secondarily affected. It is thus not necessary that a perforation of the cartilage should occur in these cases, and healing would naturally take place, with the formation of a cicatrix in the mucous membrane.

We come now to the consideration of two conditions of more doubtful nature, namely, granulomatous growths, and excoriations and scars of the septal cartilage, occurring in syphilitic individuals.

In order to understand these conditions, we must bear in mind certain facts in connection with the portion of cartilage under consideration. This region is particularly exposed to irritations and injury, both from the facility with which it can be reached, and also from the fact that it is the first portion of the mucous membrane to receive the incoming current of air.

Examination of the interior of the nose, after the inspiration of air, in which a powder of conspicuous color, such as compound stearate of zinc is suspended, shows a sharply circumscribed deposit over the anterior portion of the quadrangular cartilage, about two millimeters behind the columnar cartilage, and immediately above its junction with the vomer. Constant living in a dry atmosphere must result in a considerable loss of moisture from the epithelium over this area, and it is thus easy to see that injuries here would be repaired with greater difficulty than in a more sheltered spot. This

region corresponds to the situation of the origin of Jacobson, and joins immediately the so-called Schiefferdecker's transitional zone, namely, that portion of the septum where pavement epithelium is still present. Individual variations exist here to so great an extent, that it is difficult to set up a normal type. Thus the organ of Jacobson, which is fairly constant in animals and in the human embryo, but is usually rudimentary in the human adult, and discoverable only microscopically, may at times, be conspicuous, as in a recent case, which came under my observation. Here it occurred on the concavity of a septal deviation, in a man forty years of age, as a soft, rounded, swelling, about the size and shape of a small split pea, with an opening admitting a fine probe for a distance of three millimeters.

On the other hand, the columnar, ciliated epithelium, which normally exists here, may be replaced by pavement epithelium, with the production of a so-called dry anterior rhinitis. This condition has been investigated by Ribary, and is found to consist in an extension of the pavement epithelium from the transitional zone, with atrophy of the underlying mucous glands and adenoid tissue. This condition is a most important etiologic factor in habitual nosebleed, and in perforating ulcer. Ribary believes that the erosions which occur in this condition, may at time, give rise to polyp-like excrescences, as the result of a proliferation of the mucous membrane, leading to the formation of the so-called bleeding polyp of the septum. Local tubercular infection may occur in this situation, giving rise to the formation of ulcers and tumors. In syphilis, granulomatous excrescences may arise at this portion of the septum, resembling closely a tubercular granuloma. Their differential diagnosis is often extremely difficult. Such syphilitic granulomata, or syphilomata (Kuttner), in structure and arrangement, stand nearest to the gummata. This similarity is the more striking in the younger stages of both conditions. In both cases, the process begins with circumscribed aggregations of cells in the deeper portions of the tissue, and it is not possible at this stage to determine the ultimate result. Gradually through the swelling of the deeply seated tumor, the mucous membrane is forced out towards the interior of the nasal cavity. While

however, the mucous membrane in the case of a gumma is raised in a hill-like fashion above the normal level, the granuloma shows a swelling far above the original level, and may even become pedunculated. In this stage their differences become marked. In the gummata, the component elements show a very slight vitality. Only in a few places are the unstable round cells transformed into the more stable and permanent form of spindle cells, and thence into permanent connective tissue. Much more frequently we see retrograde metamorphosis and disintegration. In the syphilitic granulomata, degenerative appearances may be found, particularly obliterative endarteritis, toward the periphery, but nowhere a central necrosis and softening.

The histologic separation of these syphilitic granulomata from those of tubercular origin is not always easy. In general, the microscopic appearances are similar, the chief points of distinction being as follows.

Syphilis.

Numerous new-formed blood vessels among the proliferating endothelial and connective tissue cells.

Giant cells and aggregations of epithelioid cells few.

Tuberculosis.

Few new-formed blood vessels, among the proliferating endothelial and connective tissue cells.

Giant cells and aggregations of epithelioid cells numerous.

The peculiar excoriations and scars found in cases 6 and 7, could not be referred with certainty to syphilis, yet they presented certain characteristic points of distinction from the ordinary lesions due to simple trauma and secondary pyogenic invasion. These features are a rough granular floor, irregularly traversed by cicatricial mucous membrane, the whole area being surrounded by a dentate or sinuous border of normal mucous membrane. These appearances suggest an antecedent ulcerative process, which has shown a tendency to irregular progression and regression, rather than a traumatic lesion, affecting the whole of a given area simultaneously.

It is, of course, impossible to exclude other causes of ulceration than syphilis, and the material at hand is as yet too small to justify definite conclusions, in regard to the nature of the process. Nevertheless, in view of the course and mode of healing of superficial, tertiary syphilis elsewhere in the mucous membranes, the possibility is at least suggested in the two cases reported, that these lesions are the result of antecedent superficial gummatous infiltration. The cases are reported for the purpose of directing attention to the possibility of a syphilitic origin in a certain number of cases of septal excoriations and scars

III

A CASE OF INFECTIVE THROMBOSIS OF THE LATERAL AND SIGMOID SINUSES.*

BY

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Frank R., eleven years of age. His mother thinks he had earache during teething, but insists that he has had no ear pain nor discharge during the last seven years until three weeks before admission, when, during an attack of "cold in the head," he complained of aching in the right ear, followed by slight discharge which ceased in a few days. Since this the boy had not been well, complained of feeling tired, lost flesh, had fever on some days, none on others. Though he had distaste for food, there was no nausea, no vomiting, no chills, no sweats, no headache, no vertigo, no pain back of the ear. The bowels had been somewhat costive.

On admission the boy was pale, emaciated, and had an appearance of general toxemia. His expression was not anxious, his mind was active and unimpaired, tongue somewhat coated, breath not offensive, glands normal, urine negative, nose, throat and lungs negative. Pulse 120, temperature 104, respiration 30. He was somewhat somnolent, irritable when aroused for medicine or thermometry, but when awake perfectly clear mentally, and, when asked, answered that he felt well and had no pain anywhere. Ear examination showed a little pus in the canal, slightly greenish in color,

*Read before the meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, Pittsburg, Feb. 22, 1904.

not fetid, and a small perforation in Shrapnell's membrane occluded by a plug of cheesy pus. The postero-superior wall sagged slightly, there was no mastoid tenderness, no edema over mastoid or emissary vein, nor in the upper posterior cervical triangle, nor over the internal jugular vein.

Eye examination by Dr. Curry negative.

The classical Schwartz operation was done in the usual way by Dr. Milligan. The mastoid cells were normal and no pus or pathologic material was found until the antrum was reached. It contained a few drops of thick pus which was evacuated. The swollen membranous lining was curetted, the occluded aditus thoroughly cleaned out, and a free return flow of posteriorly injected fluid obtained. The tegmen tympani and tegmen antri were probed in search of erosive defects, but none was found. As the cells toward the tip and toward the sinus were absolutely normal, it was decided not to explore further, though it was recognized that sufficient pus had not been found to account for a temperature of 104. Yet, as this operation was being done on the day of admission, previous to which there were no systematic temperature and pulse records, it was deemed best to defer further exploration until a temperature chart and further observations could be obtained.

For the four following days his symptom-complex consisted practically of emaciation with a temperature ranging from 97 to 104, with a daily rise and a daily fall, the rise without a chill and the fall without a sweat. The pulse ranged from 90 to 120, the respiration from 22 to 34.

There were absolutely no other symptoms of any kind, no chills, no sweats, nausea, vertigo nor headache. Dr. Koenig and Dr. Burt saw the case in consultation and found nothing but a slightly enlarged liver, which, however, was not tender. Quinine up to 16 grains daily had no influence on the intermittent temperature. In consultation it was decided best, in the absence of other discoverable cause, to explore the sinus.

The mastoid wound was found healthy and was beginning to granulate. The scalp incision was extended backward, and it was noticed that when the periosteal elevator cut off

the mastoid emissary, a drop of pus oozed from the cut vein. The rongeur rapidly enlarged the bony wound backward. No osseous erosion was discovered, no granulation tissue, no pus. The bone was everywhere perfectly healthy, though the cranial surface of the bone, as noticed when a rongeur chip was turned over, was darkened slightly where it had lain in contact with the sinus. A vertical inch of the sinus laid bare was found to be free from granulations or extra-dural pus; on palpation it seemed thickened, though its contents were certainly not solid. An incision three-fourths of an inch in length evacuated a stream of greenish fluid pus and cheesy debris. The sinus was cleared to the jugular bulb, but no return flow of blood was obtained. Before proceeding further it was decided to ligate the internal jugular vein, and an incision was made in the neck over the course of the vein from the level of the mastoid tip to the clavicle and the vein rapidly exposed. It was found collapsed, though some blood was coming into it from the facial. After the facial was tied off, and we were about to pass the ligature, the vein began to fill. It was quickly passed and the ligature was tied just above the clavicle, after which the vein slowly filled until enormously distended. No branches other than the facial and thyroid were found, so two ligatures were tied as close up to the bulb as possible and the vein cut between and removed. The contents of the excised portion of the vein were afterwards examined. A few minute clots infected with streptococci were found adherent to the intima, but, of course, there was no thrombus. The neck wound was closed and protected while we returned to the sinus. I rapidly enlarged the bony wound backward to the external occipital protuberance, slitting the sinus with small probe-pointed scissors and curetting as far as the curve of the sinus permitted, until the torcular was reached. Here the curette at last brought red blood clot, followed by a good flow of blood. The other end was then cleared to the jugular bulb. There was no flow from the superior or inferior petrosal, in fact no blood nor red clot from anywhere, only fluid and cheesy pus and debris. The cranial wall of the sinus, while thickened, did not seem softened, and minute examination did not reveal a fistula at any point. The entire lateral and sigmoid sinuses were cleaned out thor-

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oughly, irrigated with bichlorid solution, dusted with iodoform, the entire wound was packed with iodoform gauze and a few sutures were used to approximate partially the external wound.

The operation lasted about two hours, almost no anesthetic being necessary during the last hour. Shock was severe. The pulse was 160 and had become very weak and thready, the breathing rapid and shallow. A total of 1/10 of a grain of strychnin sulphate had been given during the operation. An enema of salt solution was given and preparations for an intravenous saline made. The enema and oxygen, however, soon rallied the pulse and respirations above the danger point.

The post operative rise of temperature did not exceed 102°. The wound was dressed at the end of a week and found to be clean and granulation processes proceeding satisfactorily.

Convalescence was established, and the boy gained in weight, seemed bright, ate heartily, and the temperature was normal. About the third week after the operation the temperature rose to 103, fell to nearly normal, rose again as high as 104; and continued to fluctuate in this manner for a week, with an occasional sweat but no chill, and without any symptoms localizing a pus focus elsewhere than in the head, yet I could not bring myself to believe there was any further pyogenic intracranial extension; and, the wound, being clean, healthy and granulating rapidly, could not cause the irregular temperature. After a week of this, he began to complain of pain in the right iliac fossa, where a mass was found to be forming. The right thigh became semi-flexed, an effort of extension eliciting pain. The veins of the right side of the abdomen became distended and showed out strongly as compared with the opposite side. The patient was for this condition transferred to the West Penn Hospital under the care of Dr. Macfarlane, who cut down upon the mass and found that it surrounded the iliac artery and vein. It seemed extra-peritoneal, though its extent was not explored and the abdominal wound was closed without any attempt at removal. The recovery was perfect and complete; the boy is now in the best of health. A microscopic examination of a specimen of the abdominal mass

removed at the abdominal exploratory operation showed it to be inflammatory glandular tissue, and Dr. Macfarlane could suggest no pathologic relation between it and either the otitic or the intracranial condition.

This case presents a number of peculiarities worthy of study.

First, the very slight ear symptoms, consisting of an earache in a previous healthy ear, lasting a day or two, ending in a discharge which soon ceased.

Second, a diagnosis solely on emaciation, the temperature chart, and exclusion.

Third, infective sigmoid and lateral sinus thrombosis without any disease of the mastoid cells, being evidently an infection not by direct extension nor osseous erosion, but by infective thrombosis of the minute veins passing into the superior petrosal and sigmoid sinuses from the middle ear. The thrombosis extended downward to the bulb; but evidently the clot about the inferior petrosal orifice was not yet firm, giving way and partially filling the collapsed jugular after the facial was tied off.

Fourth, an intercurrent abdominal condition with pyemic symptoms simulating those of intracranial pyogenic extension.

IV

LARYNGEAL STENOSIS FROM POST-TYPHOID PERI-
CHONDRITIS, TRACHEOTOMY, THYROTOMY,
INTUBATION.—EXHIBITION OF
TWO PATIENTS.*

BY EWING W. DAY, M. D.,

AND

CHEVALIER JACKSON, M. D.,

PITTSBURGH, PA.

CASE I.—A. Di M., laborer, Italian, aged 22, was admitted to the service of Dr. John W. Boyce in the West Penn Hospital, for typhoid fever, in about the second week of the disease. Following the rule in the hospital he was sponged with cold water every time the temperature crossed 103. In spite of faithfully applied hydrotherapy, the temperature would often shoot up to 105. Some days, as many as ten spongings in 24 hours were necessary. This is mentioned to show the severity of the typhoid. At the end of the fourth week the temperature touched normal, and convalescence was established in the fifth week. In the sixth week some hoarseness developed, accompanied by dysphagia and some swelling and tenderness externally over the larynx. Dr. Day was called to see the case at this stage and found the patient slightly cyanotic, with a mild inspiratory dyspnea. On laryngoscopic examination, the epiglottis and arytenoids were found to be swollen into three edematous, rounded masses,

*Read before the Meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, Pittsburgh, Feb. 22, 1904.

and all landmarks obliterated. His diagnosis was edema of the larynx from perichondritis of the thyroid, arytenoid and epiglottidean cartilages. Though he had little faith in the value of intubation in such cases, he deemed it worthy of a trial, but found the symptoms unrelieved by a tube. Free scarification of the larynx evacuated a quantity of serum with temporary relief. He left instructions, that if the symptoms should increase, a tracheotomy should be done. The symptoms increasing during the night, Dr. MacFarlane opened the trachea. Dr. Boyce, who was present, states that the symptoms had not been urgent, but while preparations for operation were being made, he turned around and saw that the patient was black in the face and had ceased to breathe. His opinion is that typhoid patients often die in this manner in the absence of a physician, without the immediate cause of death being suspected. Be this at it may, our experience in the examination of the larynges of 280 typhoid cases, shows laryngitis in 40 per cent., ulceration in 11 per cent., perichondritis in 4 per cent. A detailed report of these examinations will be the subject of a future paper.

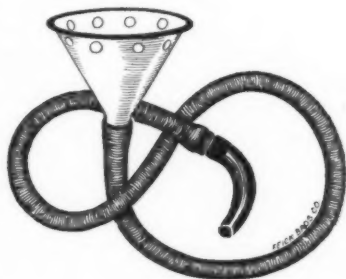
The inflammatory symptoms associated with the perichondritis subsided in about ten days. The patient on one occasion withdrew the outer tracheal canula, immediately became cyanotic and nearly expired of asphyxia before he was discovered and the interne arrived to replace it. Later, when the tube was withdrawn, it was found that only a small amount of air could pass the larynx, deep cyanosis immediately setting in. Sufficient air passed for a rough, rattling phonation. In this condition he was turned over to us to see if the tracheal canula with its attendant inconvenience and dangers could be done away with. Upon laryngoscopic examination, the vocal cords were found obliterated, their place being taken by thickened, rounded masses of apparently thickened infiltrated and cicatricial tissue, the left mass being larger than the right. A narrow slit about one-eighth of an inch long and of no appreciable width was apparent on forced expiration with the tracheal canula closed with the finger. Through this, evidently, phonation, such as it was, was produced.

Under cocain anesthesia, this slot was dilated with first a number 4 (American) male catheter, gradually increasing to a number 15. This was followed by the smallest Schroetter's laryngeal bougie, which was, however, the limit of dilation. Larger sizes could not be passed without more force than was deemed wise. No improvement, whatever, was obtained from two months of this treatment, the tissues resuming their swollen condition immediately after dilation and no useful amount of air could pass. A specially made intubation tube of adult length and as large in diameter as could be passed without violence, gave no useful amount of air. Divulsion with McKenzie's laryngeal forceps was next tried, with no better results, and with considerable inflammatory reaction.

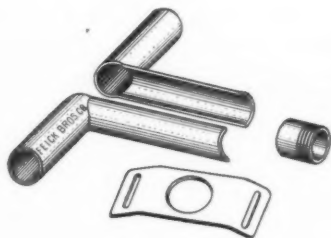
On August 26, 1903, under chloroform anesthesia, we split the thyroid and cricoid cartilages down to the tracheotomy wound, retracting well with small sharp retractors. The interior of the larynx was found filled with cicatricial and infiltrated tissue, the cords obliterated, and only the arytenoids remaining of the landmarks. With curved scissors, the entire contents of the larynx down to the thyroid perichondrium was clipped out, leaving the aryepiglottic folds, and the remnants of the arytenoids undisturbed. A large mass of granulation tissue on the back wall of the trachea at the site of the fenestrum of the trachea canula was also clipped away. The canula was replaced and the larynx packed with an iodoform gauze strip, to the far end of which catgut was attached to make counter traction on the packing to prevent its working out and down the esophagus.

We then devised a tracheal canula that would extend upward as well as downward, so as to keep the laryngeal lumen patulous until the cavity was at least partly lined with epithelium. This was worn for about a month, taking out daily for cleansing. Then a large sized aluminum intubation tube was made and inserted, and the patient put upon a strict liquid diet. Imagine our astonishment the next day, on removing the tube, when he vomited great masses of meat, potatoes, beets and other vegetables only partly masticated. Evidently the presence of this enormous tube did not interfere with deglutition. The tube reached below the

old tracheotomy wound which was now allowed to close. For two months the tube was worn with perfect comfort, the patient serving as order y in the wards. The voice, of course, was only a loud whisper.



On November 19, the tube was removed, and was followed by a gradually increasing dyspnea for six hours, due to reactionary engorgement of the mucosa, previously subjected to pressure. After the sixth hour the dyspnea grew less and less, the swelling went down, and the patient is



now comfortable and going about his work as well as ever.

As to voice, he has as much as he had at any time since his trouble began. That is, he converses in a loud whisper, and there is good hope that an adventitious fold of mucous membrane will some day yield him a certain degree of phonation.

CASE 2. Elias Shokowsky, a Galician, 25 years of age was admitted to the West Penn Hospital in the service of Dr. Litchfield, on August 8, 1903, for typhoid fever. The temperature on admission was 104° F. Next day the maximum was 105. For three weeks it could be only kept within bounds by ice packs, several times daily, in spite of which 105.4 is recorded in many places on his chart. At the end of the 4th week in the house, about the 6th week of the disease, the normal was reached. In the 3rd week double acute purulent otitis media developed, pouring out a stream of purulent sanguinous serum amounting to 2 or 3 ounces daily. Later, the pus changed to a thick creamy character, though very abundant. On the 45th day, the temperature which had been normal began to rise to 99°, sometimes 100°. However, no symptoms of mastoid involvement were present, other than the rise of temperature, which is common in typhoid without purulent complications. A diagnosis of mastoid empyema was made and the mastoid opened. The mastoid cells were broken down by necrosis, and filled with pus, granulation tissue, and necrotic debris. Nothing was noted of a very different nature from many other similar cases complicating typhoid. The course was uneventful and the wound has now healed.

In the third week of the typhoid, a double pneumonia developed, ran a ten days course and subsided. In the fourth week a laryngitis developed with spots of sloughing, followed by ulceration at the anterior commissure, on the left false cord, on the right arytenoid, and on the left half of the under surface of the epiglottis. There was a slight edema, but no cyanosis or dyspnea, though he was watched closely. He had a slight odynphagia, but no dysphagia. There were a slight aching and considerable tenderness not only in the larynx but down the trachea as far as palpable.

About a week after the mastoidectomy, the temperature which had been about normal since the post-operative rise, began to fluctuate, rising to 101 and falling to normal. The deepening laryngeal ulceration had reached the cartilage, which was rapidly breaking down, from which the larynx was constantly filling with pus, edema began to develop and on the 65th day of the typhoid, the 37th day of the laryngitis,

cyanosis and dyspnea necessitated a tracheotomy which we did. A vertical inch of the trachea was slit open to permit of free inspection. The mucous membrane was found ulcerated in spots and so edematous that only a child's size tracheal canula could be inserted. The 2nd, 3rd and 5th cartilages were found thickened and evidently inflamed, though actual necrosis could not be made out. On palpation externally on the skin surface, no rings could be felt, owing to the intercartilaginous swelling.

The day following the temperature shot up to 104 and pneumonia was feared, but the next day the temperature fell to 99°, ranging from this to 100° for a few days, plainly due to the chondritis and perichondritis. After the tracheotomy, the repose of the larynx seemed to bring about a prompt resolution of the laryngeal disease. Both the edema and the inflammatory symptoms all subsided and in five weeks the ulcerations had all healed and the mucous membrane was in a healthy state. There remained, however, a complete laryngeal stenosis due to:

- 1st—Abductor paresis.
- 2nd—Ankylosis of both crico-arytenoid articulations.
- 3rd—Cicatricial bands uniting the false cords.
- 4th—Cicatricial hyperplasia narrowing the chink to a pin-hole.

The voice was totally lost; lip motions, with a puff of air from collapsing his cheeks, being the only attempt at speaking.

The typhoid and its complications had left his health shattered, so that it was deemed best to delay operative work looking to the abandonment of the trachea tube until there would be less likelihood of cartilaginous necrosis and slow cicatrization, with their vicious tendencies to stenosis. This favorable period was not quite reached, as the wearing of a trachea tube, with its attendant discomforts, cough and pus formation, is not conducive to perfect health.

On January 22nd, 1904, just one month ago, it was deemed advisable not to wait longer. The larynx was split open by an incision through the thyroid cartilage, the two halves of which were widely separated by small sharp retractors, and the interior of the larynx swabbed freely with

1:1000 adrenalin and 20 per cent. cocain solutions. The operation was carried out about as in the previous case; a combination of the Trendelenberg and the Rose position was relied upon to keep the blood out of the trachea. How well it served the purpose is shown by the total absence of lung symptoms in both these cases. The chloroform was administered through a gauze covered funnel connected by a soft rubber tube to a curved hard rubber tube which was inserted in first the trachea tube; then, later, when the incision was extended down to the tracheotomy wound, the hard rubber tube was held in the trachea at the lower angle of the wound. The Trendelenberg tampon canula is in our opinion, too much in the way for convenient work in thyrotomy, and the tampon is needless if the position be properly maintained. Gravity is better than the tracheal tampon.

After the operation, the Day-Jackson larynx-trachea tube was inserted, the thyroid cartilage brought together by catgut sutures, a little silkworm gut drainage inserted and the skin wound brought closely in apposition down close to the stem of the tube around which a little iodoform gauze was packed. The post-operative rise was to 100°, after which it remained about normal. The tube was taken out daily for cleansing. The diet was liquid for two days, then light solids. No difficulty was experienced in swallowing as the upper arm of the tube was arranged to just reach to the base of the epiglottis, which closed it tightly during deglutition. The neck wound healed down to the trachea tube by first intention, and healing of the mucous surface in the interior proceeded rapidly. At the end of two weeks it had proceeded sufficiently far for the insertion of the large aluminum intubation tube, which has been in ever since. At first he rather hysterically claimed he could not swallow even in the Casselberry position, so we procured an infant's nursing bottle filled with milk. The mirth and jibes of the other patients at sight of this aroused his ire to such an extent that he grabbed up the bowl of milk that he had claimed he could not drink, and he swallowed the whole of its contents without removing it from his lips. Since this there has been no trouble in feeding.

The external wound has entirely healed and he

is now going about the ward in better health than before the operation and is steadily gaining in vigor since the abandonment of the trachea tube. The intubation tube causes him no discomfort and his whispered voice is now good, whereas before the thyrotomy he had no voice at all.

The question might be asked, why not insert the intubation tube at once after the thyrotomy. The objections are:

First.—That edema of the epiglottis and of the ary-epiglottic region followed the operation in both these cases. It was not great but might have led to some obstruction by puffing over the upper end of the tube.

Second.—The mucous membrane is less subjected to pressure during the post-operative swelling by the T-shaped tube.

Third.—The mucous membrane can be inspected and treated at the daily cleansing of the tube.

Fourth.—There is a strong tendency to the formation of a hyperplastic node on the posterior tracheal wall from the prolonged wearing of the ordinary curved trachea tube, which of course, is always (and rightly) used after tracheotomy. This is best combated by the Day Jackson tube with its straight "run" and with, if deemed necessary, the application of medicaments, if there be any tendency to exuberant granulations.

Fifth.—If cartilaginous necrosis should occur it can be seen and combated early, without endangering either the life of the patient or the success of the operation.

Sixth.—Drainage, which is very essential, especially during the first two weeks, is best accomplished by the T-shaped tube with a little strip of iodoform gauze packed around the stem.

Seventh.—With this tube and drainage not only is there no danger of pus reaching the lungs, but the cough, which of course is the final safeguard, is very much less; so that the parts get more rest and heal more steadily.

The enormous size of the intubation tubes is, we think necessary to insure the largest possible lumen in the healed larynx. Of course, its size is exactly adapted to the case, so that no undue pressure on the cartilage is exerted. Aluminum is the only available material of which to make them.

Any other metal would be too heavy for so large a tube, while hard rubber would not have necessary strength if made as thin as is desirable. The only drawbacks to the aluminum tubes are that both boiling and bichlorid solutions roughen the surface, and the softness of the metal renders it especially liable to scratches and mutilation, which of course, must be polished off again to prevent the formation of abrasions and ulcerations of the mucous surface. The shape differs from the ordinary O'Dwyer tube in having a large inter-arytenoid swell on the head, which is necessary to retain the tube in the absence of all endolaryngeal structures. The neck of the tube also is proportionately thicker than the O'Dwyer tube. This must not be construed as a criticism of the O'Dwyer tubes, which are perfect, but they are of course, intended for the entire larynx, while here we have the eviscerated larynx to intubate. The first tube inserted in the first case while large at inter-arytenoid swell was not sufficiently so, so that it slipped down far enough to allow the swollen ary-epiglottic folds to close over it. As the lower end of the tube extended below, and closed off, the tracheal wound, respiration was impossible, deep cyanosis set in, and if the tube had not been immediately pushed up by clamping it with a hemostat through the external wound, immediate asphyxia would have terminated the case.

The T-shaped trachea tube is made of german silver. The size should be exactly adapted to the case both as to outside diameter and the length of the downward, but more especially the upward arm, which should just reach the base of the epiglottis, extending as high as can be closed by the epiglottis when it comes down in swallowing. The length will depend upon the vertical dimension of the thyroid cartilage, the position of the epiglottis (which not only varies but may be displaced and distorted in these cases), and on the position of the original tracheotomy wound, as it is desirable to bring the stem of the T-shaped tube out through the old wound. While the tube must not be so thick as to have an insufficient lumen, it must have sufficient thickness of metal not to lose its shape in the daily removal and cleansing, and to ensure a perfect fit, without a crevice, when brought together and the collar put on. A crevice would induce ex-

uberant granulations. The edges of the upper and lower arms should be rounded and not too thin, to avoid injury of the mucous membrane in insertion. The tape holder is more for the purpose of retaining an iodoform drainage dressing than for retention of the tube and should have a large hole so as to not drag laterally upon the tube; to prevent which, it is well, also to seal down the tapes at the side of the neck with either collodion or adhesive strips. The daily, sometimes bi-daily, cleansings are necessary as the secretions dry and "gum" on the inner surface of the tube. The entire tube must be removed for this, as it is not possible to have an inner canula in this shaped tube. The daily removal has, however, the advantage of facilitating a close watch on the healing process. The tube is inserted, first the lower arm, then the upper, as the latter has more latitude of motion than the lower, which goes into the uncut tracheal rings of more or less rigid lumen. The lower arm going in first is readily slipped in with the fingers, while the upper arm may require the assistance of a long slender pointed hemostat clamped to the wall of its stem in the long axis. After placing, it is necessary to be sure that the flanges at the intersection of the upper and lower arms of the tube fit together perfectly, which will be shown by close contact of the two halves of the stem outside the wound, and the even edges at the stem orifice. Then, and not before, the collar should be slipped on. In removing the tube, after removal of the collar, the two halves of the tube will be found agglutinated tightly together by exsiccated secretions, so that they can only be separated by inserting a thin hemostat in the orifice and separating the blades. The upper tube is removed first, usually requiring only the fingers.

With regard to the ultimate outcome of these cases, the first patient is able to get along now without his intubation tube, and the second will be able to as soon as it is deemed advisable to take it out. The first case has had his tube out for a month at a time, when it was put in again, not on account of dyspnea, but because: first, it seemed advisable on the score of safety during an acute "cold" involving both nose and throat; second, it seems to us better to obtain the largest possible ultimate laryngeal lumen, a result to which

prolonged intubation may conduce. But even if occasional or even interminable intubation were necessary or advisable in a given case, no laryngologist, and certainly no patient, would hesitate to choose the intubation tube in preference to the tracheal canula; first, on account of its safety from pulmonary risk, especially in going out of doors in cold and dusty weather; second, on account of its needing cleaning only once every month or two, if at all; third, on account of its enabling the use of the whispered voice, without blowing foul air from a tracheal wound into the listener's face, or the stopping of the canula with the fingers; fourth, except for the whispered voice, the patient goes about among his fellow-men without feeling like a freak of nature in breathing through a hole in his neck; fifth, a tracheal canula is a very annoying and uncomfortable thing to wear with its granulations, pus and constant nastiness, requiring a dressing that interferes with the wearing of a collar. An intubation tube after a few weeks becomes perfectly comfortable, the patient not being aware, from any sensation, that it is there—just as with artificial teeth; Sixth, and by no means the least important, is the matter of health. No patient can enjoy a full degree of health while wearing a tracheal canula, whereas an intubation tube is no detriment whatever. The first case wore a trachea canula of the usual curved form for six months, without ever feeling perfectly well. He was easily fatigued and would lie down on his bed for several hours a day. Three weeks after intubation, he was an active barber, and later on, an orderly on the wards, fit for full duty and has ever since enjoyed life as much as ever, his health in every way being perfect. The second case wore the ordinary curved tracheal canula for six months, during which he was feeble and in poor health. Now, after two weeks of intubation his health is better than at any time, and he will at the present rate soon be as robust as ever. In these considerations, the fact of these two cases being typhoid convalescents, is not overlooked, but compared to the hundreds of other typhoid convalescents observed in the hospital, the detrimental influence of the canula on the health was readily noticed. As to danger of occlusion, we think an obstructed intubation tube could be coughed up. This happened

once in case No, 1. Case two was in imminent danger of death from occlusion of the tracheal canula (the usual curved form) by granulations, which continued to obstruct after the tracheal canula had been removed by the nurse. The respiration had ceased when one of us arrived and removed the obstructing granulations which hung down over the trachea in the wound in a flap-like valve, which allowed expiration, but shut promptly any attempt at inspiration

V

CHOLESTEATOMATOUS DISEASE OF THE TONSILS.*

BY NORVAL H. PIERCE M. D.

CHICAGO.

If some may deem an apology necessary in introducing such a time-worn subject as the supratonsillar space which prefaces this paper, I shall plead at least a novel manner of treatment of the subject and that I believe new points are brought out for your consideration.

The supratonsillar fossa is an irregularly shaped cavity situated above the tonsil between the anterior and posterior pillars of the fauces. Its roof is supplied by the upper leaf of the soft palate; its floor by the tonsil and anterior and posterior pillars when they join the tonsils; its outer wall by the tonsillar fascia; and its inner wall by the anterior and posterior pillars and what has, as far as I am able to discover, not been described, a fold of mucous membrane which I shall denominate as the *plica triangularis superior*. The significance of this fold from pathologic therapeutic stand-points, will be dwelt on later.

It may well be called the *superior* triangular fold in distinction to the *plica triangularis* with which we are all familiar and which may now be designated the *plica triangularis inferior*. As the base of the *plica inferior* is attached to the anterior pillar, the base of the *plica superior* is attached to the posterior pillar and runs forward to be lost in the anterior pillar.

In order to examine the fold, and any examination of the throat is incomplete without a thorough exploration of this region, it is well to put it on the stretch, and this is best done by inserting a blunt tenaculum back of the anterior

*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society, Pittsburgh, Pa. Feb. 22, '04.

pillar and pulling it forward; and in this way, too, do we best expose the supratonsillar fossa. This fold varies in its development in different individuals. In some it is very well developed; in others, rudimentary. The largest fold that I have seen measured eight millimeters, the measurement having been taken in the horizontal direction where the base leaves the posterior pillar. It is made up of mucous membrane in which occasional muscle fibers are found, derived from the palatal muscles. On its inner surface we occasionally find lymphoid structure resembling tonsillar tissue.

The shape of the supratonsillar fossa is very variable and irregular. Usually by means of a probe we find that the outer portion extends in two conical extremities posteriorly and anteriorly up for a considerable distance into the soft palate. The same may be said of its inner portion. The floor is supplied, as before mentioned, by the tonsil; lifting the plica triangularis superior, or turning out the tonsil from its fossa by means of a blunt tenaculum, we see in the so-called tonsillar helix, minute openings which correspond to the lacunae within the substance of the tonsil.

Farther outward is to be found a cavity which lies between the tonsillar substance proper and the tonsillar facia. This cavity is fairly constant in its occurrence, and, from a pathologic standpoint, is, to me, of great importance. This may be called the appendix of the supratonsillar fossa. It is not an enlarged lacuna, but is an anatomic space surrounded by epithelium derived from the mucous membrane of the supratonsillar space and which extends downward to a line drawn at the base of the tonsil or farther downward approaching the sinus pyriformis, where it ends in a blind extremity. It has a diameter varying from one to several millimeters. The supratonsillar fossa and its appendix are supplied by the tonsillar artery, or arteries, the tonsillar nerves, and the whole is covered by squamous epithelium.

Passing to the pathology of the supratonsillar fossa, I shall direct your attention to two conditions which are the most important and frequent in occurrence, namely, metaplasia of the epithelium and peritonsillar abscess. Metaplasia of the epithelium within the crypts of the tonsils may

occur at any portion, but is not infrequent in the depths of what we have described as the appendix of the supratonsillar space. Frequently by exploring the dilated crypts emptying into the helix of the tonsil, we may find whitish, foul-smelling, waxy masses which are the result of the metaplastic process. These have been erroneously regarded as decomposed food which has become lodged in the lacunae. This process is not confined to the crypts of the tonsil, but may occur from the diseased epithelium of the supratonsillar walls themselves.

The pathologic process to which Siebenmann has given the name metaplasia, occurs in various portions of the body, namely, in the middle ear, the mastoid cells, the frontal sinus, the maxillary sinus, etc. In the mastoid cells and middle ear these masses are known under the name of cholesteatoma. *Macroscopically and microscopically I have found that the plugs from the tonsils, or supratonsillar space are indistinguishable from cholesteatoma of the ear except that the masses in the tonsils have no limiting membrane; in fact, they are produced by the same causes—exfoliation of epithelium, fatty degeneration, and finally, decomposition of the mass.*

As to what the ultimate cause of the disease is, that is, the cause which produces the exfoliation of the epithelium we are ignorant. Whether it is due to an invasion of the crypts by the epithelium of the tonsillar surface, I am undecided whether the metaplasia is due to a specific acid-forming bacterium which has the same staining reaction as the bacillus tuberculosis and which is probably constantly associated with cholesteatomatous disease, I cannot at this time aver, but the chronicity of the process is probably due, in part at least, to retention. As soon as one layer of epithelium is cast off the process of degeneration of the underlying surface epithelium is repeated, and thus layer by layer the plugs are formed. This excentric increase may produce pressure sufficient to cause pressure atrophy of the tonsillar tissue surrounding the walls of such cavities as are related, or if the tonsillar substance is invaded by pathogenic micro-organisms, hyperplasia of the tonsil parenchyma thus the tonsillar substance itself is increased, while the lacunae, or crypts of the tonsil, undergo dilatation. I believe this to be a frequent cause of tonsillar hyperplasia.

Here permit me to accentuate the importance of the pus

tonsillar appendix in this regard, inasmuch as this is a cavity which is frequently occupied by these malodorous plugs. In the removal of the tonsils we do not, by the ordinary methods include this cavity—indeed, I regard it as dangerous to cut outside this space, as it is in almost immediate contact with the fat which separates the tonsil from the tonsillar fascia; and this leads me to call your attention to the peculiarity of the blood supply of the tonsil.

If we remove the tonsil from its niche we come upon a hard, firm, fibrous fascia which sends septa into the parenchyma of the organ. Immediately outside of this we find fasciculi of the musculus pterygo-pharyngeus and buccopharyngeus. Further out we may come to a space occupied by fat which is divided into a posterior and anterior portion by the musculus stylo-glossus and stylo-pharyngeus. The posterior portion accommodates the carotis internus, vena jugularis and the nervus vagus. The carotis externa and interna cannot be wounded in a tonsillotomy in which the incision is sagittal, but the majority of dangerous hemorrhages are in all probability due to the wounding of the tonsillar arteries at their point of egress through the tonsillar capsule. The arteria tonsillaris is derived from the arteria palatina ascendens, which on a level with the tonsil divides into two branches which penetrate the tonsil fascia and enter directly into the tonsil. A large branch is frequently sent to that portion which lies at the outer extremity of the supratonsillar space, but for the most part, the upper portion of the tonsil is relatively poorly supplied with blood.

The great danger then, in excision of the tonsil is the division of the tonsillar arteries as they emerge through the tonsillar fascia. When this is done the fascia does not permit them to retract nor contract, but holds them open and the blood pressure is sufficient to wash away any clot that may form until such blood pressure is greatly reduced by exsanguination. Demi, ("Ueber Gefassanomalien im Pharynx," Wiener klinisch Wochenschrift, 1901, No. 48) suggests that a number of profuse hemorrhages following tonsillotomy may be explained by the wounding of the arteria lingualis. That this artery does occasionally send a loop into the tonsillar niche directly outside of the fibrous tonsillar capsule, cannot be doubted.

My experience would lead me to believe that the majority of profuse hemorrhages after tonsillotomy are due to wounding the arteria tonsillaris (or its branches) at the point where it perforates the tonsillar fascia. In order to destroy the blind sinus which I have designated the appendix of the supratonsillar fossa I have had made a pair of scissors which I herewith present. After tonsillotomies I am in the habit of inserting one blade of the scissors into the sinus and dividing it. Care must be taken that the walls of the sinus are kept open. This is readily done by tearing apart any of the adhesions after the third day, which is accomplished with the blunt tenaculum; the surfaces are then painted with nitrate of silver fused on a copper probe. Especially is this important when we find on exploration that the sinus contains the foul-smelling plug above mentioned.

In several instances in singers, I have noticed that, notwithstanding the removal of the tonsils, laryngeal irritation continued until the slitting of the sinus was performed. Great benefit, in the majority of cases, followed immediately upon this procedure. Numerous instances of *fetor ex ore* yield only to this operation.

When this metaplasia affects the supratonsillar fossa, its permanent cure can only be effected by a removal of the entire upper pole of the tonsil. An adhesive process between the plica triangularis superior and the upper surface of the tonsil may change the supratonsillar fossa into a more or less closed cavity. I believe, from my observations, that this simple fact, together with the co-existence of cholesteatomatous disease, is the cause in the majority of instances, of peritonsillar abscesses. Surely peritonsillar abscesses are by far best reached through the supratonsillar fossa by merely separating the adhesions between the upper walls of the supratonsillar space and tonsil; not only are we more sure to find the pus in this location, but the danger from hemorrhage is rendered nil. I herewith present a little instrument which I have invented for the purpose of evacuating such abscesses. You will notice that the edges are blunt so that no hemorrhage is possible. The blades of the instrument are inserted outward, and somewhat upward, until the sense of touch conveys the impression of the instrument having

entered the abscess cavity. The blades are then separated and the pus permitted to escape. Pressure on the tonsil will aid in the evacuation of the abscess while the instrument is held in place.

After the subsidence of the acute symptoms of peritonsillar abscess, it becomes imperative to remove sufficient of the upper fold of the tonsil to allow the supratonsillar space to drain permanently. If the tonsils are enlarged sufficiently to warrant their excision, these are removed, but more important than the removal of the lower portion of the tonsil, is the excision of their upper poles by means of either the tonsillar punch, the scissors, or the probe pointed knife. I submit herewith an original instrument which has several advantages over many of the punches in use.

First, its strength; second, the shifting shaft which enables us to change the cutting blades from right to left.

After the upper pole has been removed, our attention should be directed to slitting the cavity which we, have designated the appendix of the sinus. Even after the most thorough exploration and operation, however, we will find recurrence of this cholesteatomatous disease of the tonsils in certain cases, and only by repeated destruction of the crypts in which recurrences take place may we hope for complete and permanent cure.

31 Washington Street.

VI.

OBSERVATIONS ON THE ACTION OF THE CRICO- THYROIDEUS AND THYRO-ARYTENOI- DEUS INTERNUS.*

JORGEN MOELLER AND JOH. FRED. FISCHER.

All authors are agreed that the above named muscles are to be regarded as the muscles that produce the voice; but the theories as to how they act are subject to wide differences. Some authors ascribe the greatest influence in regulating the pitch to one of the above muscles, and some to the other.

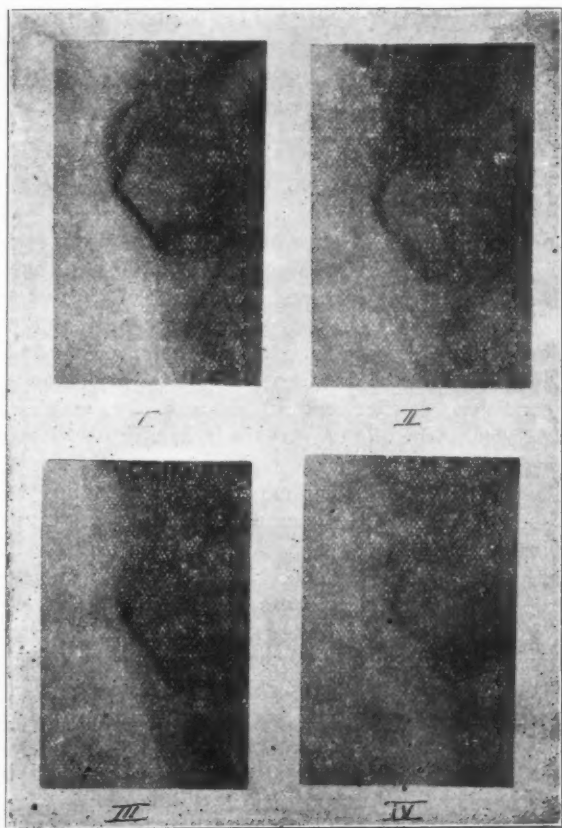
The crico-thyroideus muscle has the power of bringing the cricoid and thyroid cartilages closer together. It is not, however, certain which cartilage should be regarded as the punctum fixum, nor is it determined whether the expression of the whole musical scale, in which the human voice is included can be explained entirely by the degree of contraction of this muscle. Most authors believe that the pitch is dependent on the degree of contraction of the crico-thyroideus; others, however, e. g., Ewald, claim that this muscle fixes the cartilages only in their common conditions, but is unable to approximate them as closely as would be necessary in assuming that it influenced the pitch to any degree.

In order to clear up this question, we have made use of the Roentgen rays, and after a number of experiments we were able to make a series of plates which completely showed the action of the crico-thyroideus.

The subject of our experiments was a 67 year old man, whose voice was normal. The Roentgen bulb was held to the right of the larynx, so that the focus was at the height of the space between the cricoid and thyroid cartilages, and in such a way that a perpendicular drawn from the focus to

*Report from the Clinic for Diseases of the Ear, Nose and Throat in the General Hospital at Copenhagen, Prof. Holger Mygind, Chief.

the sagittal plane of the body would strike the anterior border of the cricoid cartilage. The distance between the larynx and anticathode measured 45 cm., the time of ex-



posure was 12-15 sec. The photographic plate (lumiere 7x9 cm) was enveloped in black paper and held as closely as possible to the right of the larynx and parallel to the sagittal plane.

During quiet respiration, the distance between the two cartilages anteriorly is 15 mm. (Fig 1); during intonation of the sound *g* it is only $7\frac{1}{2}$ mm. (Fig 4). In order to determine the influence of this change of position on the vocal bands, it will be necessary to glance a moment at the skeleton of the larynx. The axis around which the movement takes place, stretches between the two crico-thyroid articulations. If a line is drawn from this axis to the anterior and superior border of the cricoid cartilage, and another to the point of the processus vocalis (the arytenoid cartilages are regarded as fixed in relation to the cricoid) there is constructed an angle of nearly 90° whose horizontal side measures in an adult about 23 cm. and whose vertical side is about 16 cm. long; its length then is about $\frac{1}{3}$ of the horizontal. If this angle is rotated around its axis, it will be seen that the end point of the vertical side (the point of the processus vocalis) passes over $\frac{2}{3}$ of the path that the end point of the horizontal side (the anterior part of the cricoid cartilage) traverses. Now if the distance between the cricoid and thyroid cartilages was lessened by $7\frac{1}{2}$ mm. the vocal bands would be lengthened 5 mm. If the length of the vocal cords be considered 16 mm., they would be lengthened about $\frac{1}{3}$, which is entirely sufficient to explain the increase in tension which must be considered necessary to produce the above mentioned tone.

On the other plates one can see that the distance between the cartilages is gradually decreased the higher the desired note lies; if the scale is followed from note to note, there will be found small irregularities which are not to be considered remarkable since numerous causes lie at the bottom of these errors, which we cannot here discuss. As a whole, however, it is clearly seen that the distance mentioned is decreased about $\frac{1}{2}$ in a relatively high note, and in a deep note is decreased but in a much less degree. (Fig 2 and 3.)

We thereupon tried to determine which of the two cartilages was to be regarded as the punctum fixum. Since the larynx moves in toto during phonation, we stuck, for the purpose of measurement, three shot on the skin of the anterior border of the sterno-cleido-mostoid, which had been proven by the preceeding experiments to remain immovable

during phonation. The shadows of the shot coincide on all the plates, so that they could very well be used for the purpose of measurements. It was shown that the cricoid cartilage moved upward toward the thyroid, while the latter remained in its original position.

As far as the thyro-arytenoideus internus is concerned the theories disagree still more, so much so that some state that by its contraction it causes relaxation of the vocal cord, while others, and indeed most, claim that its contraction makes the vocal cords tense. In what way this takes place has never been satisfactorily explained.

In order to get at the action of this muscle one of us (Möller) directed his attention to the elastic membrane of the vocal cords. If the ends of a rubber band are fixed in some way and the fixation points are separated from one another, the band becomes thinner in the middle, the more so the greater it is stretched. Something similar must take place in the case of the vocal cords, as can be shown with a small model. This consists of two triangular pieces of wood joined together by a cross-bar on which one plate can move to and fro. On two edges of both plates a rubber membrane is fastened so that it makes a sharp fold which corresponds to the free border of the vocal cords; furthermore, one border of the membrane is fastened to the cross-bar, corresponding to the attachment of the membrana elastica to the border of the cricoid cartilage. If the pieces of wood are now drawn apart it is seen that the folds become more and more concave. When the free border is $3\frac{1}{2}$ cm. long, it is 1 mm. from the straight line in the middle, with a length of 4 cm., it is 2 mm., and with a length of $4\frac{1}{2}$ cm., the deviation is $2\frac{1}{2}$ mm. If a thread is carefully fastened in the fold of the membrane and one end is fastened at the corner of one plate of wood, while the free end passes through a small groove at the corner of the other plate, the action of the thyro-arytenoideus can be imitated; for if the end be pulled it will be seen that the concavity of the fold disappears, and in the same way the thyro-arytenoideus internus causes by its contraction, the concavity of the full border of the vocal cords to disappear.

Therefore, the action of the crico-thyroideus is not suffi-

cient to bring about the straight line, which the cords must possess in phonation. The stronger the muscle contracts the more concave becomes the border of the vocal cords; only after the thyro-arytenoideus has acted is the straight line produced. Both muscles must always work together to bring about that form and tension of the vocal cord necessary for the formation of a tone

The photographs show:

- (1) Radiogram of a larynx during quiet respiration.
- (2) Radiogram of a larynx during phonation of a.
- (3) Radiogram of a larynx during phonation of d.
- (4) Radiogram of a larynx during the formation of g.

In order that they might be reproduced clearly the pictures were treated in the following manner: The outlines of the laryngeal cartilages were drawn on the original Roentgen photographs with the "negrostift." and the pictures so touched up were again photographed.

A series of the original radiograms will be reproduced in the "Archiv. f. Laryngologie," Vo. XV.

VII

REPORT OF A CASE OF CHRONIC PURULENT OTITIS MEDIA, WITH THROMBOSIS OF THE LATERAL SINUS; RADICAL OPERATION; EXCISION OF INTERNAL JUGULAR VEIN; RECOVERY.*

EDWARD BRADFORD DENCH, M. D.

NEW YORK CITY.

A boy, about ten years of age, was admitted to my service at the New York Eye and Ear Infirmary, with the following history: Both ears had discharged since infancy. For about a week before the patient came to the hospital he had been suffering from pain in the ear so severe as to prevent his sleeping at night. Preceding his admission to the hospital this pain had increased in severity, and had extended to the mastoid region. On examination, the boy appeared to be poorly nourished and extremely weak and anemic. The neck seemed stiff, the head being slightly flexed upon the right shoulder. Examination of the right ear showed that the greater portion of the membrana tympani had been destroyed. There was some granulation tissue in the fundus of the canal, and the postero-superior wall of the canal, close to the fundus, was greatly swollen. Palpation showed considerable tenderness over the tip of the mastoid, the tenderness extending backward over the region of the emissary vein. Examination of the left ear showed that the greater part of the drum membrane had been destroyed upon this side as well. There was no evidence of any acute inflammatory condition in this ear. The boy was then taken into the hospital, and at once placed upon the operating table. There was no fluid pus found in the antrum, although this cell contained

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, at the meeting held in Fall River, Jan. 30, 1904.

some cholesteatomatous material. The entire cortex of the mastoid was rapidly removed and upon opening a large cell at the tip, considerable pus escaped. This pus pulsated, showing that it was in contact with the dura. On account of the history of long-continued suppuration, a radical operation was rapidly performed, the mastoid antrum, middle ear and meatus being quickly thrown into one large cavity. The cell at the tip containing pus, was next opened, the cortex being removed until the bottom of the wound could be wholly inspected. This removal of the cortex revealed the lateral sinus in the bottom of the bony cavity. The sinus was exposed by means of the rongeur as high up as the knee, and in the opposite direction as far as the bulb. On palpation, the sinus did not pulsate, and seemed to be occupied by a clot. In the exposure of the sinus, the mastoid emissary vein opening into it was also exposed. The clot in the sinus extended for a considerable distance out into the mastoid emissary. The sinus wall was incised, and by means of a curette, a clot about an inch long was removed from the upper portion of the sinus. Free hemorrhage took place from the torcular extremity of the vessel. Pressure was then applied and a curette was introduced into the sinus, and carried downward toward the bulb. Some portions of the clot were removed, but no free bleeding occurred. The boy had borne his anesthetic badly, and had required frequent hypodermatic stimulation throughout the operation. I therefore, decided to proceed no further, but quickly dressed the wound in the usual manner, and had the patient returned to his bed. Although the operation had lasted but fifty minutes, the boy was extremely weak, and I did not believe that he would bear the anesthetic sufficiently long to admit of an excision of the internal jugular vein at this time. After his return to the ward, where a high saline enema was given, the patient was also given strychnin in full doses hypodermatically. He rallied immediately and on the following day the temperature was $99\frac{1}{2}^{\circ}$ in the morning. It rose to 101 in the afternoon, and as he was in such good condition I decided to excise the internal jugular. I was led to do this from the fact that I had obtained no hemorrhage from the lower end of the sinus and felt convinced that there was a clot in the

jugular bulb. The operation presented no unusual difficulties. The vein was excised from a point about an inch above the clavicle to the base of the skull, the tributary branches being divided between two ligatures. The deep lymphatic glands lying about the sheath of the vessels were much infiltrated and were also removed. The wound in the neck was closed throughout its entire extent by interrupted sutures of silkworm gut and silk. The operation lasted about an hour and ten minutes. The boy was returned to bed in excellent condition and has made an uneventful recovery.

An examination of the lymphatic glands removed and of the walls of the vein, showed that both structures were infiltrated with small cocci.

The case is of interest, in the first place, as showing how insidiously general systemic infection may occur in a case of chronic purulent otitis. The patient had been suffering from an aural discharge practically for his entire life, yet the acute symptoms were only of about a week's duration. Again, the boy had not been confined to bed and walked into my clinic, although he was at that time very seriously ill. Another point of interest is that at the time of his admission he had but a slight elevation of temperature. It must be remembered that invariably in all cases of chronic suppurative otitis, and especially in those in which acute symptoms supervene, before the mastoid is opened, the surgeon can form very little idea of the extent of the lesion. In this case the only evidence that was present of a severe infection was a profound anemia from which the patient was suffering and the appearance of the face which so often accompanies profound septic infection.

Another point of interest is the very radical steps taken to eradicate the source of systemic infection. I believe that if cases of sinus and jugular thrombosis are to be saved by operative interference, such interference must be of the most radical kind, and must be instituted before profound septic symptoms make their appearance. In this case, the boy on admission had practically no temperature, and aside from the fact that he looked very ill, and that his face seemed to indicate the presence of sepsis, there was absolutely no reason for supposing that so

radical an operation as the one performed would be necessary. After I had thoroughly cleared out the mastoid, and removed the clot from the sinus, I confess that the temptation was rather strong to go no further. Had his condition permitted, however, I should have proceeded on general principles at once to excise the internal jugular vein. On the following day the condition appeared in every way favorable, and mistaken conservatism would have delayed the operation on the jugular. That this would have been unwise is clearly shown by the pathologist's report. Had we waited until there was a marked rise in the temperature before removing the internal jugular, it is more than probable that the operation would have been performed too late, and that the patient would have succumbed.

In a number of cases operated upon previously the patients have not come under observation until late in the course of the disease. In these cases the characteristic septic temperature has first been present, the fluctuations ranging from 99° to 106° in the course of a few hours. It has been my experience that whenever these pronounced fluctuations in temperature have been present, the convalescence of the patient has been much prolonged. I believe, in every instance where a clot is found in the lateral sinus at the time of operation, and free hemorrhage cannot be obtained from below, that the surgeon should proceed at once to excise the internal jugular vein and the surrounding lymphatics, if these are infiltrated. In my own patient, as before stated, the general condition of the subject did not permit of immediate operation, and, apparently, the twenty-four hours' delay did no serious harm. In all of these cases, however, where free hemorrhage is not obtained from below, excision of the jugular should at once be performed.

VIII

CHOLESTEATOMA. WITH REPORT OF A CASE.

DR. WILLIAM H. DUDLEY,

EASTON, PA.

OPHTHALMIC AND AURAL SURGEON TO THE EASTON
HOSPITAL.

The term cholesteatoma is applied to tumors of neoplastic growth containing cholesterin and made up of laminated layers of squamous cells.

This mass when held between the fingers yields readily to pressure and gives a characteristic caseous feel; it also has a peculiar characteristic odor, which, I think, when once thoroughly appreciated is likely not to be forgotten.

These masses are usually roundish in shape, often of pearly whiteness on the outer surface, and of a yellowish or brownish color when broken open.

The first to describe this condition, as far as we are aware, was Cruveilhier in 1829, who observing their pearly glistening appearance, called them *tumeur perlee*; but it was not till 1838 that Johannes Müller made a careful examination of these masses and discovered that they contained cholesterin, as well as laminated squamous cells and called them *cholesteatomata*. Virchow in 1858 and still more recently Bostroem, in 1897, have gone still more extensively into the study of the condition; and from the standpoint of the latter there seems little left to be discovered, and were it not for the fact that the ultimate origin of these tumors is still somewhat nebulous, the length and strength of his argument need hardly be considered. He maintained that these tumors have their origin in aberant epithelial cells, which in

* Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society at the meeting in Fall River, Mass., January 30, 1904.

some manner become included in the central nervous system (or elsewhere) at the time of their formation; in case the conditions favor proper nourishment these cells continue to develop and multiply, and in time may develop to more or less size by the process of cell multiplication on the exterior, while the interior often undergoes fatty degeneration and is associated with more or less deposit of cholesterin crystals.

On the other hand Benke has shown that the meningeal steatomata are produced by a proliferation of *endothelial* cells of the pia, and bases his opinion on the fact that staining brings out the outlines of these endothelial cells, which would not be true were the tumors of epithelial origin. He further states that, inasmuch as these tumors may be found in the meninge; and ventricles of the brain, in the marrow of long bones and the petrous portion of the temporal bone, and in the testicle and ovary, the cells from which they originate and by which they grow must be of endothelium and not of the epithelial variety.

Among the cholesteatomata of sufficient size to be deemed worthy of reporting is one by Kuhn, reported in the *Zeit. f. Ohrenheilk.*, Weisbaden, January, 1891, he states that there existed a mass of this character about the size of an egg in the mastoid process of a patient upon whom he operated and revealed the exposed dura mater of the cerebellum, thickened and pulsating, and lined with a thin white glistening membrane. Under treatment the parts healed within four weeks and the patient left the hospital.

F. B. Mallory of Boston reports in the *Reference Handbook of the Medical Science* that within the past few years there have been found three cases of cholesteatoma of the brain at the autopsy table of the Boston City Hospital. These ranged from one-half cm. to seven cm. in diameter; the first was found imbedded in the tissue of the cerebellum where it joined the pons; the second was found at the posterior end of the third ventricle, while the third and largest lay at the base of the brain on the right side, and extended from the optic commissure out beneath the right frontal lobe; it lay beneath the pia, and had so forced itself into, displaced and compressed the adjoining brain tissue. It might almost have been thought to have originated within it.

Another large tumor of this variety is reported by Dr. O. Körner of Rostock in the *Archives of Otology*, Vol. XXX., p. 323. He states that it extended from the mastoid antrum backward to the torcular Herophili, that from pressure the cranial bones had lost their diploe and become very thin, and the lower part of the occipital lobes and the cerebellar hemispheres had become much compressed and displaced.

The mass appeared to have remained quiet till the patient had an attack of la grippe with acute otitis media, when it became infected through the aditus, when pain, fever and some swelling behind the ear called for operation. Although no measurements are given it is stated that the cavity would accommodate two hens' eggs. The patient recovered in about two and a half months.

In reference to the frequency with which these neoplasms are met, various writers vary widely in their opinions. Many state that the condition is rare, while among others, Grunert, for instance, states in the *Munch. Med. Wochenschr.* July, 1893, that he regards cholesteomata as retention masses, their involvement of surrounding parts resulting from their growth and pressure, rather than from direct infiltration, their occurrence being far from uncommon. During five years of clinical work he has found cholesteatomata in 17 per cent of all aural patients. I very much suspect that the authors who have spoken of this condition as being rare, have had reference to that form which is seen independent of suppurating otitis media; while those who consider it of common occurrence have reference entirely to the latter complication.

The case which I wish to present came under my care recently, and I deem it of sufficient importance to report it. Mr. ————aged 40, married, belonging to a robust family of Pennsylvania Germans, a blacksmith by trade, came to the Easton Hospital, November 19, 1903, with the following history:

He states that he had always been healthy, had never had any trouble with his ears that he is aware of, and that up to a comparatively recent period his hearing had always been good, though he had noticed for a few months previous to his illness that his hearing was not as good as formerly; but he had had no pain, tinnitus or other disturbance until the be-

CHOLESTEATOMA, WITH REPORT OF A CASE.

beginning of this present illness, which dated back about one week previous to being admitted to the hospital, when he had a dull, heavy feeling in the left side of his head, but not much pain until Nov. 11th, when he had some pain in the left ear; four days later he noticed a foul-smelling discharge from the ear. About this time upon examining the side of his head, two or three inches back of the ear, he could feel a depression in the skull, and as he pressed, a quantity of thick, cheesy, foul-smelling material was forced out of the auditory canal. The patient states that soon after this his headache became severe and at times his mind was not clear this occasioned considerable alarm and was the cause of his coming to the hospital.

Examination revealed that the auditory canal full of this caseous material, and on syringing it out, the return flow was followed by a foaming out of water, debris, etc., showing the presence of more or less gas in a cavity communicating with the auditory canal; the posterior wall of the canal was badly prolapsed, preventing a view of the deeper structures. He was admitted on the afternoon of Nov. 19th, 1903, and within an hour an operation was performed. On making an incision behind the ear and pressing the soft parts back, there spurted out a stream of fluid purulent material six or eight inches from the wound, again revealing the presence of gas under pressure. As the scalp and periosteum were removed backward from eight to ten cm. an opening was found in the cranium five cm. long, and varying from one to two cm. wide, into which a probe was admitted freely in all directions. This opening was enlarged sufficiently to clean out the cavity, the contents of which were for the most part a broken down, cheesy mass in the center, with the firmer cholesteatomatous mass, with more or less of the nearly white covering characteristic of these growths, in the periphery.

After thoroughly cleaning out the cavity, which now measured eight cm. antero-posteriorly, seven cm. vertically, and varying from two to four cm. in depth, the exposed cranial bones were found to be reduced by pressure in places to the thickness of thin card board, and thinning still more toward the opening where it disappeared.

The boundaries of this cavity were: Below, the posterior

fossa, anteriorly, the petrous portion of the mastoid, medially dural covering of the cerebrum and cerebellum with the thinned cranial walls for the exterior.

The tissues adjacent to the cavity appeared healthy with the exception of a circular area of the dura immediately below the original opening, about the size of a twenty-five cent piece which looked greyish, though not especially diseased. After the operation the patient's temperature, which on admission was 101, soon became normal where it remained, and he was discharged from the hospital in about three weeks feeling well, but with a large portion of his cavity remaining, some of which he still carries.

After removing the neoplasm and cleansing the cavity, a communication was found to exist between the cavity and the auditory canal, fully one-half cm. in diameter, two cm. from the external auditory meatus, and it was through this opening that the patient was able to press out some of the decomposing tissue; although I looked repeatedly for the aditus, to establish communication with the tympanic cavity, it was not found, and although inspection showed a small perforation in the anterior segment of the membrana tympani, there was no discharge, and I am of the opinion that the perforation was caused by extra- and not by intra-tympanic pressure. Inasmuch as the hearing improved very much and promptly after the operation, I am led to believe that the tympanum was not infected through the aditus, nor the cholesteatomatous mass from the tympanum, nor to any degree was the tympanum infected by the way of the external auditory canal.

There is a possibility in this case, that in infancy this patient may have had an attack of otitis, which before the patient could remember recovered with an extension of epidermis into the mastoid, which in the course of years continued to grow by the constant forming and exfoliation of cells, which by their accumulation and pressure were responsible for this large cavity; but I would be more favorable to the supposition, that in the formative period of fetal life epithelial cells found their way into the posterior cerebral fossa and there, under favorable nutritive conditions, began to multiply and to crowd the brain in one direction, and by pressure

caused the absorption of bone in the other, until this large cavity was formed, an opening established in the temporal and occipital bones, and another the external auditory canal.

The pressure of this material in the canal, and upon the membrana tympani caused its partial destruction, impairment of hearing, and the dull heavy feeling on the side of the head of which the patient complained, and this was all, till this mass became infected probably in the external auditory canal, when it extended backward into the mass of the tumor, when the rapid increase of pressure of the gas caused by its decomposition, brought on the more acute symptoms.

It is interesting to note the amount of displacement of the brain which these tumors may cause without noticeable cerebral disturbance. In this case the displacement amounted to no more than thirty cc., though the one quoted by Korner the brain was displaced or compressed to the extent of eight cc., or over two and a half fluid ounces; and the only explanation of this toleration, appears to be in the exceedingly slow growth of the tumor.

DISCUSSION.

Dr. E. B. Dench, New York—I have been very much interested in the paper by Dr. Dudley, as I am in all papers which bear on cholesteatoma. I must say that the case reported by him is a unique one, and that so far as I know, no case similar to this has been reported. I understood the Doctor to say that there was no tympanic infection; I think there must have been some tympanic infection, as otherwise it would have been impossible to have found a cholesteatomatous deposit in the mastoid. I believe that a cholesteatoma of the mastoid is invariably secondary to tympanic infection.

Dr. Dudley.—The reason I think the cavity became infected by way of the canal instead of the tympanum, was that there appeared to be an abundant opportunity for infection in this way, as the communication between the auditory canal and the cavity of the cholesteatoma was so large, and further I was never able to demonstrate a communication between the cavity of the cholesteatoma and the tympanum. The cavity

has never made an attempt to fill by granulation, but the walls of which have become covered over with a membrane somewhat resembling mucous, and it has been a question with me for sometime as to how best to dispose of it. If I could close the communication with the auditory canal I shall consider the question of closing the external opening also, but this appears to be a difficult thing to do. The interior is now perfectly clean and dry, and has been for some time.

Dr. Dench.—I would like to ask Dr. Dudley whether he did a radical operation or simply a typical mastoid operation.

Dr. Dudley.—The operation was typical of nothing. I simply enlarged the opening sufficiently to clean out the cavity.

Dr. Dench.—It seems to me that in this instance, I should advise that a typical radical operation be done, and that the middle ear and mastoid cells, together with the large cholesteatomatous cavity, be made continuous with the external auditory meatus. If this is done, and the interior of the cavity grafted by the Thiersch method, a perfectly smooth dry cavity would result. I think it would be a mistake to treat the cholesteatomatous cavity separately, for as long as this space is separated from the middle ear and canal, the disease is liable to recur.

Dr. Dench spoke of two cases which he had recently seen in which the mastoid antrum seemed to be completely shut off from the middle ear by bony tissue; in each case there was considerable pus in the large cell at the tip of the mastoid. In all these cases, mastoid tenderness developed early and at the time of operation the destruction of tissue in the mastoid was very extensive. The early appearance and the persistence of mastoid tenderness was in all probability, due to the fact that the superficial cells of the mastoid were extremely well developed and that infection of these superficial cells probably took place through the blood vessels leading from the middle ear to the mastoid; in neither of these cases did the patients complain of any spontaneous pain. It is in this class of cases that Politzer deems it wise not to enter

the antrum at the time of operation. I do not agree with him on this point. I think that if no true *aditus ad antrum* can be found at the time of operation, one should be formed, as the layer of bone separating the antrum from the middle ear will always be found somewhat softened in these cases.

Dr. W. S. Bryant, New York.—I have never seen a case of this kind with such a large capsule, but I agree that it probably had a tympanic origin and started from diseases of the tympanic mucous membrane which is continuous with the lining of the mastoid cells.

IX

REFLEX CARDIAC INHIBITION RESULTING FROM IRRITATION OF THE PERIPHERAL FIBERS OF THE TRI-FACIAL NERVE AND OCCURRING IN THE COURSE OF AN OPERATION FOR CHRONIC EMPYEMA OF THE FRONTAL SINUS.*

GEORGE FETTEROLF, A. B., M. D.

PHILADELPHIA.

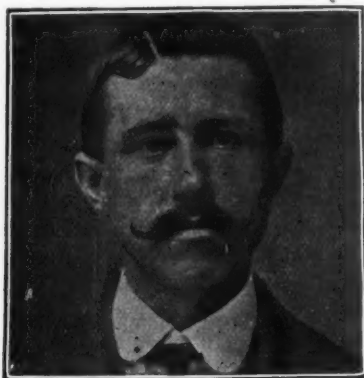
In the course of operations on the upper air passages, in regions supplied by the terminal fibers of the fifth cranial nerve, I have at times noted an embarrassment of the circulatory apparatus which was entirely out of proportion to the severity of the operation or the general condition of the patient. It was not until the patient whose case is herewith reported came to the table that the true inwardness of the situation occurred to me, and on looking up the literature of the subject and working out an explanation of the phenomena, I elicited several points which should prove to be of practical as well as scientific interest to those working in rhino-laryngologic fields.

The patient is a vigorous working man of 35 and a caulker by occupation. His family history is negative as far as his nasal condition is concerned, his father being alive and healthy at the age of 75, his mother having died from a gastric tumor at the age of 35 and his only brother having been killed at the age of 40. As a child he had measles and mumps and 13 years ago had a severe attack of inflammatory rheumatism, which left his heart unimpaired.

* Read at the annual meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society, held at Fall River, Mass., January 30, 1904.

*From American Medicine.

His more recent personal history is of decided interest since during the last five years he has had three severe blows over the bridge of the nose and right frontal sinus, the first by a baseball 5 years ago and the others by pieces of timber 4 and 2 years ago. Following the first of these injuries he suffered considerable suprarorbital pain, associated with a great deal of hemorrhage and nasal obstruction. From this on he was never free for any length of time from a sense of fullness, throbbing and supraorbital pressure, associated with which was a feeling of exophthalmos. These attacks became longer and longer in duration and the intervals increasingly



short. Winter before last he came to my clinic at the Methodist Hospital and I gave him only palliative treatment, as his condition then did not warrant external operation. The ideal procedure at that time would have been the conventional one of removing the anterior half of the middle turbinal, but his septum was so far deflected to the right that this was impossible and a straightening operation was out of the question, because the nasal irritation was too great to allow of even a brief retention of any form of splint. After attending the clinic for a few weeks, he disappeared and I saw nothing of him until the latter end of last February, when he returned with the old train of symptoms. At this time the middle turbinal was very much inflamed and there was a large polypus depending from its inner surface, near

the hiatus semilunaris. Removal of this failing to give him any relief I had him admitted to the house and put to bed. He was suffering intense pain over the right eye, his upper lid could scarcely be raised and there was distinct bulging of the supraorbital area. In addition the power of hearing in his right ear was becoming impaired. For a week his nose was spayed with a warm alkaline solution of suprarenal gland and cocain, followed by a bland oil. Cold compresses, changed every ten minutes, were used externally. He had a daily remission of his symptoms in the morning, but they would return in all their severity in the evening. Palliative treatment having availed nothing, I determined to operate.

The patient was prepared in the morning by shaving his moustache and eyebrows and his scalp as far back as the coronal suture. Just before the operation his conjunctival sac was cleaned with boracic acid solution and his forehead and face with mercuric chlorid solution and alcohol. The area of operation was covered with a sterile dressing which was allowed to remain in place until anesthesia was complete. The external incision began at the junction of the outer and middle thirds of the eyebrow and terminated over the lower margin of the glabella. The soft tissues and periosteum were retracted and a button of bone removed with a $\frac{3}{4}$ inch trephine. As soon as the edge of the trephine entered the sinus and before the button was completely severed sero-pus and flakes of lymph exuded from the wound. As the opening after the removal of the button was not sufficiently large to permit of thorough curetting of the sinus, it was enlarged upward and outward with rongeur forceps, care being taken to keep the supraorbital margin intact. The mucous membrane was found to be covered with foul-smelling granulation tissue and pus, which was especially thick at the entrance to the infundibulum. This was curetted away until the entire bony wall of the sinus was exposed. There were no spots of caries in the walls, nor was there any communication with the sinus of the opposite side. The probe passed freely into the nose without eliciting any suggestion of caries, and in the absence of Panas' probe an ordinary silver one was introduced into the infundibulum and brought out of the anterior naris. This was moved backward and

forward a number of times and the passageway thus made patulous. The cavity was syringed freely with hydrogen dioxid until froth ceased to come from either sinus or nose and then douched with hot boracic acid and permanganate solutions. After thorough drying the whole interior of the sinus was swabbed with 50 per cent. zinc chlorid solution, and again douched. The cavity was then packed with acetanilid gauze and the outer $\frac{2}{3}$ of the wound closed with interrupted silk sutures, the inner third being allowed to remain open for the purpose of packing and douching. An ordinary sterile dressing was applied, the eye being covered with a disc of gauze dipped in boracic acid solution and the hollow at the inner canthus filled with cotton.

The interesting feature of the operation was the occurrence of a trigemino-cardio-inhibitory reflex. Each time the curette would be applied to the sinus wall there would be a marked diminution in the force, fullness and frequency of the pulse, along with distinct cyanosis. The curetting had therefore to be frequently interrupted. This phenomenon has occasionally been noted in operations involving areas supplied by the fifth nerve and especially by dentists. One of my assistants told me that he frequently anesthetized for dentists and when chloroform was the anesthetic used had so often noted cardiac embarrassment at the instant of the extraction of the tooth that he had become quite timid about giving an anesthetic for any dental operation. The particular area of the fifth nerve involved in the case just described was, of course, the mucosa of the sinus. In none of the standard textbooks on anatomy have I been able to find any description of the nerve-supply of this region. It must unquestionably be from the trifacial, and examination of a number of skulls leads me to the belief that the principal source is from the supraorbital with possibly additional filaments from the nasal and the malar branch of the temporo-malar.

That this reflex does occur has been proved experimentally by Brodie and Russell¹, who, among their conclusions, state the following: "The connection of the respiratory tract with the cardio-inhibitory center is very close. Thus, stimulation of the nasal mucous membrane at once

arrests the heart. Stimulation of the laryngeal mucous membrane is only a little less effective. Stimulation of the trachea and large bronchi is apparently without effect, but stimulation of the alveolar nerves is about as effective as that of the laryngeal. These nerves produce the result when stimulated electrically in their course from the mucous membrane or when stimulated electrically or mechanically in the mucous membrane itself." The path of the impulse is clear. It runs through the afferent fibers of the fifth to the Gasserian ganglion, then through the fibers of the sensory root to the deep origin which comprises the sensory nuclei in the floor of the fourth ventricle and the gray substance of the substantia gelatinosa of Rolando as far down as the second cervical nerve. From these situations the path to the nucleus ambiguus, which contains the motor centers of the vagus, is short and direct and is probably through some of the fibers of the posterior longitudinal bundle.

Normally, the relations of the nuclei of the fifth and tenth cranial nerves are directed and controlled by centers situated higher up. This control is usually not materially interfered with during ether anesthesia, but when chloroform is used the connecting fibers between the two deep origins are given much freer play, and as a consequence any irritation of the peripheral fibers of the trigeminus may produce, through the cardio-inhibitory fibers of the vagus, an amount of disturbance which may vary from only a slight degree of embarrassment to actual cessation of the heart's action. In this way may be explained some of those deplorable accidents which have happened during adenoid and dental operations and a safe rule to follow would be never to use chloroform when the area about to be operated on is supplied by sensory fibers of the fifth nerve.

A similar reflex has been proved to occur in operations on the ear by the experiments of Reik², who performed a number of operations on the tympanic structures of dogs and measured and determined accurately the effect produced thereby on the circulatory apparatus. He concludes: "The results of these and similar experiments tend to show that the faintness and other effects which attend operations upon the tympanum are due mainly to disturbance of the vaso-

motor apparatus, through irritation of the sensory nerve supply; that these nerves when stimulated show a depressor effect and usually a cardio-inhibitory action, though under some circumstance the pulse rate may be increased; and that complete anesthesia prevents the transmission of such an influence by these nerves and partial anesthesia weakens this influence."

The occurrence in aural manipulations is of much greater frequency than when the upper respiratory tract is the field of operation. It has frequently been noted and mentioned in the former connection and has occurred at the hands of all of us. I have seen it on the mere introduction of the speculum, during the incision of a furuncle, during the removal of cerumen and during operations involving the tympanic membrane. The anatomic relations here are of great interest and afford a ready explanation of greater frequency with which these symptoms occur in aural compared with rhino laryngologic work. The nerve supply of the external auditory meatus is derived from the auriculotemporal branch of the trifacial and from the auricular branch of the vagus, while the tympanic membrane depends for its nerve supply on the tympanic plexus, which is made up of the tympanic branch of the glossopharyngeal and the caroticotympanic (least deep petrosal) branch of the carotid plexus of the sympathetic. In the case of afferent impulses originating in the external meatus the path is evidently one of two:—either through the mandibular nerve and Gasserian ganglion, as described above, or through the auricular branch of the vagus to the ganglia of the root and trunk, and thence to the small-celled or sensory nucleus common to the ninth, tenth and the accessory portion of the eleventh. From here to the nucleus ambiguus is but a short and easy step. In the case of the tympanic membrane the path is probably through the tympanic branch of the ninth to the jugular and petrosal ganglia, thence to the sensory nucleus just mentioned, and then to the nucleus ambiguus or motor nucleus common to the ninth and tenth nerves. It is thus evident that the anatomic connection between the external auditory apparatus and the cardioinhibitory apparatus is much closer than that between the upper respiratory tract and the car-

dioinhibitory center, and in this would seem to lie the explanation of the fact that cardiovascular embarrassment occurs and has been noted so frequently in operations on the former, while in the latter it has passed practically unnoticed.

The after history of the case described is uneventful, with the exception that in spite of the most rigid surgical cleanliness the wound in the soft tissues became infected. As a consequence there was some annoying edema of the right eyelid, which was, of course, partly due to the necessary division during the operation of the supraorbital artery and vein. This extended to the eyelid of the opposite side, probably on account of pressure on the left angular vein, and for several days both eyes were practically closed. Some ptosis of the right side remained for several weeks, but disappeared as the inflammatory exudate became absorbed. There was, of course, and still is the usual numbness of the forehead incident to the division of the supraorbital nerve.

The external wound was not allowed to close for six weeks, and when the gauze drain was finally removed the wound healed quickly. The accompanying photograph shows what a slight degree of disfigurement remains. A slight pit which will receive the very tip of the little finger, and a suggestion of broadening of the nasal end of the eyebrow are all that remain, the rest of the scar being concealed by the eyebrow.

Systematic treatment of the nasal chambers was continued throughout, and for a while an apparently atrophic condition seemed to be developing in the area over which the pus from the infundibulum flowed, but when the pus ceased to form, the mucosa speedily returned to its normal condition.

This open method of treating the wound, while necessitating unsightly bandaging or strapping for a considerable time, does certainly seem to be the more rational procedure. What we are after is an ultimate good result, and we should not allow an ultra-refinement of cosmetic treatment as regards the bandaging interfere with our efforts to secure the best final good for our patient. Our final success must depend upon the thoroughness with which cleansing can be carried out, and while there can be no question that it is possible to syringe or douche the sinus from the nose, it is likewise certain that far more thorough irrigation can be carried

on through the external wound. And if the operator is careful to see that the sinus which is allowed to form for therapeutic purposes is confined to the inner portion of the eyebrow, the only deformity which will ensue will be a shallow pit over the dehiscence in the anterior wall and a slight broadening of the eyebrow at the point which was allowed to remain open.

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X

LOBULATED NASAL POLYPUS COMPLETELY OB-
STRUCTING BOTH CHANNELS, WEIGH-
ING 255 GRAINS.

LINN EMERSON, M. D.

ORANGE, N. J.

This patient, a coachman, aet. 35, gave a history of nasal polypi for 13 years, with complete nasal obstruction for the past 8 years. While in Ireland he was an inmate of a hospital in Dublin for 9 weeks, during which time a number of operations were performed with forceps and snare. After coming to this country he had numerous operations performed in Kansas City and later in Chicago, and while large numbers of polypi were removed, at no time was the complete nasal obstruction relieved in the slightest measure.

His appearance when he presented himself to me was that usually seen in these cases. He had the so-called frog face, with slight separation of the nasal bones. No eye or sinus involvement. General health excellent; height, 5.8; weight, 175 lbs.

There was a marked deviation of the septum to the right, and both nasal cavities were completely filled with polypi, which the patient informed me occasionally protruded from the nares and bled when irritated. The left naris being much more roomy was first attacked.

At a sitting occupying an hour and a half, I removed with a snare about a dozen polypi, the largest of which was about the size of an English walnut. The whole number completely filled a one ounce medicine glass. The following week I attacked the right side, but it being less roomy I secured only about half the quantity of polypi.

Presented to the Section on Laryngology and Rhinology of the N. Y. Acad. of Med., Dec. 23, 1903.

One week later the patient's personal appearance was much improved and both nasal cavities comparatively clear, but both posterior nares were still completely occluded by polypi which occupied the vault of the pharynx.

I completely removed the left middle turbinate and made a number of ineffectual attempts to get a snare around the polypus. Even with my finger in the pharynx I could not get the loop around the growth, as every attempt to push it upward and outward met with a resistance I could not understand.

At the patient's urgent request I finally desisted and asked him to return again in a week.

On his return he insisted his nose was still too sore to permit me to do anything further, but I finally succeeded in persuading him to allow me to remove his right middle turbinate, promising him I would make no effort to remove the growth.

I passed a pair of Knight's turbinate scissors deeply into the right side and with two cuts separated the turbinate throughout its entire attachment.

To the surprise of the patient and myself the specimen here shown dropped into the pharynx and was ejected from the mouth.

It weighed 255 grains.

It was lobulated, and the deep sulcus between the two lobules had embraced the posterior edge of the septum, thus explaining the complete stoppage of both nostrils and my inability to get the loop of the snare around the smaller lobule while working through the left nostril. Only two or three small polypi have since been removed, and when I last saw him he was to all appearances entirely cured. Since by the removal of his turbinate he has so much breathing space even in his narrower side, he has refused to allow me to correct his septal deviation.

XI

THE APPLICATION OF CONSERVATIVE AND RADICAL SURGERY TO CHRONIC NASAL ACCESSORY SINUS DISEASE.*

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NEW YORK.

The subject matter of this paper has been secured by observations upon some two hundred cases of chronic disease of the different nasal accessory sinuses, treated radically, and upon one hundred and ten cases treated conservatively. Upon a minority of these cases I have had the opportunity to operate myself. I have assisted at all of the rest and have carried out the after-treatment of the great majority.

Before passing to the consideration of local treatment, I wish to add my testimony to that of those who have insisted upon the treatment of the general condition. Too many argue, that, if proper local measures are taken the general condition will speedily improve. While this is true in a great many cases, it fails in a great many. It is also true that the local condition improves much more rapidly when the general health is cared for. A hospitalized patient does not heal well, and other things being equal, that method of treatment should be chosen which discharges the patient from the house the soonest.

It is conceded that some cases of chronic empyema yield to conservative measures, while others require radical ones. It is upon the per cent. of those which should belong to each class, that operators differ. Jansen makes the statement that if one sinus is affected, all the sinuses on that side of the head are more or less affected, and believing that, feels compelled to adopt radical methods more often than most

*Read before the Eastern Section of the American Laryngological Rhinological and Otological Society, Fall River, Mass., Jan. 30, 1904.

other men do. In my experience fully one-half of all chronic empyemas of the antrum are simple, not combined. At least in a series of forty-six cases, twenty-one were uncombined. That is, disease in the other sinuses had shown itself neither by symptom nor sign. Recognizing that empyema may lie latent without the exhibition of pus, the ethmoid and sphenoid were exploratorily opened with negative result. By far the greater number of cases can be treated successfully conservatively, and recourse to radical operation should be had infrequently. Careful and accurate diagnosis and painstaking treatment will be successful in the great majority of cases. I speak of complete relief in 50 per cent. of all chronic cases and in 90 per cent. of uncombined ones.

To consider first the application of conservative treatment to chronic empyema of the antrum. There are three methods; the alveolar, that of the canine fossa, and the intranasal.

The operation through the alveolus is, in my opinion, admissible only when a diseased tooth may be considered the active etiologic factor, and only in such cases can it be expected to yield good results. It is applicable to uncombined cases only and should never be considered the operation of choice. Although, according to Hajek and Killian, the antral mucous membrane has no particular predisposition to infection, still the trauma caused by forcing a drill through the alveolus may be sufficient to cause irritation enough materially to prolong the duration of the disease, even to infect a previously healthy antrum, from the germ-laden mouth secretions.

Communication with the mouth is in all cases to be deprecated and the first step in conservative treatment should be to close such an opening. The strongest argument that can be urged in favor of this method is that it affords free egress of fluid pus already in the antrum. The fact that it does not afford drainage from the most dependent part of the antral floor, is sufficient to show that it does not perfectly fulfill even this duty. Then too, pus in the antrum is not always fluid. It many times is very tenacious and stringy, and may lie fastened so firmly to the walls or roof, that it is removed with difficulty, even with the forceps. The after treatment generally employed is judicious irrigation or the dry method, followed, in order to maintain the

lumen of the opening of sufficient size, by the insertion of a wick of gauze, than which there is no better medium for the conduction of infective material, unfortunately, however, in both directions. If the antrum is practically dry, that is, if there is no formation of pus in the antrum itself, the upper end of the wick is nevertheless soaked with infected secretion very soon after its insertion. Then too, as Luc has put it, the patient is forced for a long period to take his food flavored in a sauce of iodoform and pus.

What has been said of the alveolar method, may be said also of the method of operating through a small opening in the canine fossa. In addition it may be said that here, as no caries or diseased tissue exists, as drainage is not very good, and additional infection almost certain to take place, there is no indication for this method of operative procedure. Soon the operator is confronted by the fact that he must either insert a hard rubber obturator to maintain a permanent opening or allow the wound to close. In the one case he forces the patient to wear a foreign body in his mouth for the rest of his life, while if he adopt the other measure he may reasonably expect a recurrence. To reopen the wound is to court reinfection. It is in the pursuance of these two methods that careful control is impossible, and recurrences most frequently occur. Many times the operator after seeing his case do well for several weeks or months, is dismayed to find not only a recurrence of symptoms, but an aggravation of the previous condition.

It is, I think, from intranasal methods that the best results from conservative surgery must be expected. To their successful use belongs not only the treatment of the sinuses affected, but of the entire nose and naso-pharynx. (This and the following statements do not refer to cases whose sole cause is an infected tooth.) Pathologic conditions are always found, and it is very generally seen that permanent results are not secured until they are corrected. It is evident that a deformed middle or inferior turbinate or ethmoidal bulla may interfere with the proper drainage of a frontal ethmoid or antrum. The fact that hypertrophic conditions are seen in almost all cases, is significant. When an obstructing septal deviation exists, the empyema is found on

that side toward which the septum deviates. If the posterior end of an inferior turbinate, or a mass of adenoid is seen to be markedly greater upon one side than upon the other, it is on that side that the empyema is generally to be found. That this is not mere coincidence is, of course, granted. The question is, in-how-far is the hypertrophy an important etiologic factor in the causation of empyema and how far does it influence its course. The hypertrophic condition, either congenital or arising from external conditions, occupation, mode of life, and so forth, particularly predisposes to influenza, diphtheria, scarlet fever, measles, and repeated head colds which are themselves the diseases most important in the causation of empyema. It is continual sneezing, hacking and coughing that loosens the mucous membrane from the naso-pharyngeal wall and predisposes to polypoid degeneration, polyps and severe infection. Nasal hypertrophy not only predisposes, but is also a direct etiologic factor, and may be considered to act in one of two ways. A posterior end or a mass of adenoid may become a depot for the deposit or formation of pus, and so become a continual feeder of infective material which may find its way into any of the accessory sinuses and set up an empyema essentially chronic from the start. The condition, then, which has been so important in causation, is naturally an important agent in determining the chronicity of the disease. I can recall cases that had for months resisted treatment, some of which had gone on to radical operation with counter opening in the nose, and which continued to pour out pus for months, finally clearing up after the removal of some apparently insignificant mass of hypertrophy.

Hypertrophies act then, as sources of infection and reinfection. They act also in another way equally important. That is, they prevent free nasal respiration, and free nasal respiration is the *sine qua non* in the successful intranasal treatment of chronic empyema. It is the failure to note this fact that compels many operators to resort unnecessarily to radical methods. It is important not only that sufficient air for breathing purposes, pass through the nose, and that the patient keep his mouth closed, but that the nostrils

functionate properly. According to the theory first advanced by M. Halle, of Berlin, the action of the air passing in and out through the nose is that of a chimney, drawing out the air and incidentally any secretion from the accessory sinuses through their ostia. In my opinion, this is important. In no other way can I account for the presence in the middle meatus of strings of dry tenacious pus which have made their way slowly out of the anterior accessory sinuses. It may be said that in the sinuses this pus was fluid, but dried after appearing in the nose. This may, to some extent, be true, but some of these cases, when opened radically, show just such tough strings of pus, very firmly adherent to the sinus walls. They often extend from the inner wall out through the ostium and into the nose. Then too, the patient after a Killian radical frontal operation, can by forced inspiration, aspirate the entire serous contents of the frontal sinus backward into his throat. Nor is this aspiration confined alone to the course of the inspired air usually given in the text-books. It is marked in the inferior meatus as well, as evidenced by the fact that the flow of tears can be much hastened by snuffling, and by the fact that a few grains of iodoform powder blown into the antrum, soon make their appearance in the inferior meatus, if an opening be present there. To those who believe in this theory will be evident the importance of correcting any abnormalities that may interfere with free and proper nasal respiration. Drainage of the antrum by aspiration into the nose is in my opinion freer and as a therapeutic agent more satisfactory than drainage by any other method. This has been born out by clinical results, for, since this theory has been evolved, cases which had previously done poorly, have after removal of nasal deviations, spurs, and so forth, made satisfactory recovery. The first step then, in this line of surgery is to establish free nasal respiration, and to correct any pathologic condition that may exist. In attacking the antrum it is in my mind, immaterial, whether one choose the middle or the inferior meatus. Personally, I prefer the inferior. Here the bone is thicker, it is true, but there is less danger of penetrating the orbit. The inferior edge of the inferior turbinate should be removed in order to give free approach

to the lateral wall of the nose. An opening should then be broken into the antrum one-half an inch by three-quarters in size. This is easily done with an electric drill or with a mallet and chisel. A curved metal tube, $\frac{3}{8}$ of an inch in diameter is inserted into this opening, and the the sinus vigorously Politzerized. Very generally by this first inflation, pus is found, though in many cases, even when pus is in the antrum, it does not make its appearance at this time. The antrum should then be thoroughly irrigated, and again Politzerized and again irrigated and dried thoroughly. Iodoform powder may then be insufflated. By this method it is safe to say that any pus in the antrum will be secured. It is important to note that at the time of operation, or at any time during the after treatment, although the antrum may sound dry at the first Politzerization, it is not wise to consider it so, for small masses of pus which are the sources of infection and which must be removed are often adherent to the walls. To overlook this fact renders the operator likely to consider the antrum healthy. This is especially true where the antrum is opened for diagnostic purposes, transillumination being negative and no positive signs of antral disease being present. A second irrigation and Politzerization are necessary to dislodge such masses. I believe in discontinuing irrigation at the earliest moment, and resorting to the dry treatment. Regeneration of the mucous membrane must thus be better assisted. This method of treatment of uncombined empyemas of the antrum appeals to me. The use of the electric drill is almost painless, quick and easy. It makes a large enough opening, so that the after treatment can be carried out without discomfort and in great part by the patient himself. In favor of this method of treatment is the fact that this opening may be maintained without danger of reinfection, and that careful control is thus made possible. It should prove satisfactory in certainly not less than nine out of ten cases.

The cases which do not clear up are combined, and, in my experience, with the ethmoid. Indeed, there is no doubt but that the ethmoid serves as a source of infection in the great majority of obstinate combined empyemas, and in all obstinate cases, should be most carefully examined. If the

ethmoid is involved, removal of the anterior half of the middle turbinate exposes several of its cells. If care be taken, operating at each sitting only so far as the field is clearly visible, ethmoids of small size may be very well cleaned out through the nose. An invaluable aid is the speculum of Kill'an for median rhinoscopy by which the different openings of the ethmoidal cells can be very clearly seen and the points of pus detected. Free daily use of the soft probe often detects infected cells not before suspected. Thoroughness in operating on the ethmoid is most important in determining the degree of success to be obtained. The anterior two ethmoidal cells and those extending over the orbit, cannot be reached through the nose. In cases which do not yield to this much surgery, the frontal sinus is probed, catheterized or Politzerized as may be possible.

In extensive ethmoidal disease involving the posterior cells, the sphenoid is at once suspected, and must be examined. The first step toward inspection of the sphenoid is the thorough removal of any septal deviation obstructing the view of the sphenoidal orifice. The opening can then in a large per cent. of cases be made out. For narrow noses, where the ostium is invisible, there is suggested under cocaine and adrenalin, the use of a soft slender silver probe, bent somewhat like a Eustachian catheter, but with a more uniform gradual curve. This probe is inserted, convexity upward, between the septum and middle turbinate, and pushed gradually upward until it rests against the cribriform plate. It is then pushed gently backward until the posterior pharyngeal wall is felt. It is now in the immediate neighborhood of the sphenoidal opening. A little manipulation very generally succeeds in passing it into the sinus. Hypertrophic turbinates do not obstruct, as the probe is passed above them, and septal deviations, whether cartilaginous or bony do not extend so high. The perpendicular plate of the ethmoid immediately below the lamina cribrosa rests almost always in the median line so that approach to the sphenoidal orifice by this route is free. If neither polyps or granulations can be felt, the patient may sit for ten to thirty minutes, the probe in position, and head bent forward, in the hope that any pus present may make its ap-

pearance on the probe. If this procedure is negative, a slender canula following exactly the curve of the probe that has already been successful' is inserted. The sinus is catheterized and a very fair idea of its condition is secured. If it be found diseased, the entire anterior inferior wall is removed, and the sinus wiped out with cotton-carrying forceps. Great care must be taken to remove the entire wall to prevent the formation of exuberant granulations and scar tissue. By removing this wall completely the annular contraction around the orifice frequently so troublesome is largely obviated, that is until the sinus is healed. After which it may be allowed to take place. This, of course, presupposes the correction of any septal deviation toward the affected side, and is facilitated greatly by the Killian speculum, which can be inserted almost to the posterior pharyngeal wall. The obstinate sphenoidal empyema is almost always combined with disease of the posterior ethmoid cells, so that they must always be considered together.

So far can one go along intranasal lines, and not until so much has been done, carefully and painstakingly, is one warranted in considering radical surgery. The first end to be secured is the alleviation of distressing symptoms, such as pain, headache, neuralgia, sense of head pressure and of illness. These are always greatly improved by the first evacuation of pus which can be accomplished quite as well and with much less cost to the patient by conservative as by radical methods. It is only when there is present malignant growth, caries, cerebral symptoms, or imminent danger of fistula formation that one may proceed at once to the greater operation. One should never resort to radical surgery because the symptoms are severe, the pus foul, and the physical depression profound. It is not by any means, true that the most chronic cases are always the most difficult to treat, and are those to require radical measures. One should not consider that because the patient has had a foul-smelling empyema for twenty years, that it will not yield to conservative methods. Many authors have expressed surprise that antra that have discharged a most fetid pus for years, should clear up completely after being irrigated a

couple of times. The reason for an apparently remarkable cure is not far to seek. They belong to what Avellis calls "Eiter-rest-Empyeme" (empyema due to traces of pus), and owe their condition to the fact that after the acute inflammation has subsided, the pus loses its virulence, lies stagnant in the cavity, forming slowly and being discharged slowly. The mucous membrane assumes a certain tolerance of its presence, and absorbs it with reluctance. The chief evidence of this condition is a desquamation and caseation of the antral epithelium, similar in odor and appearance to the cholesteatoma of chronic suppurative middle ear disease. As long as the natural antral orifice remains patent, the material makes its escape easily, especially at night. It is only when the orifice becomes occluded by dried pus or by some other means, that the antrum becomes filled with a semisolid, remarkably foul, cheesy tumor that may and sometimes does perforate the antral wall, generally the anterior one.

When now it becomes necessary to resort to radical operation there seems to me to be but one method to pursue. I have classed the intranasal operation, described by Dr. Curtis before this society last year, as a conservative one. When one chooses to operate radically, he feels the necessity of securing a free and comprehensive view of his operative field. This can be secured only by operating through the canine fossa. I have said that in general only combined empyemas require radical measures. Therefore, in operating upon the antrum, that operation should be chosen which exposes for examination and treatment not only the antrum, but also those sinuses in combination with which it is most frequently diseased, namely, the ethmoid and sphenoid. For this purpose the Kuster operation is insufficient, and the so-called Luc-Caldwell operation, or some modification of it, should be chosen. The one that appeals to me the most strongly is the one employed by Jansen, though I differ from him in some points that seem important.

The operation is as follows:

First, careful cleansing of the teeth.

Second, shallow anesthesia.

Third, insertion of gauze strips between the cheek and the

superior and inferior rows of teeth, to prevent hemorrhage backward into the throat.

OPERATION. First, incision through the mucous membrane and periosteum, just above the tooth line from the first molar to the first incisor.

Second, retraction of the periosteum and resection of the entire frontal wall of the antrum.

Third, careful inspection of the antrum, its walls, mucous membrane and contents.

Fourth, more or less thorough erosion of mucous membrane.

Fifth, removal of the median wall by means of forceps.

Sixth, curettage of the ethmoid through the area corresponding to the insertion of the middle turbinate.

Seventh, inspection of the previously treated sphenoid and removal of any pathologic contents, with resection of the entire anterior-inferior wall.

Eighth, formation of the mucous membrane flap and counter opening into the nose.

Ninth, loose packing in the antrum, ends extending into nose.

Tenth, suture of the mucous membrane flap to the median end of the initial incision.

Eleventh, complete suture of the initial incision for primary union.

In commenting upon this operation, I wish to say that a thorough and comprehensive view of the antrum, ethmoid and sphenoid is secured. The importance of leaving as much mucous membrane as possible, is great. Knowledge of the pathologic conditions existing in chronic antral disease, and the success of conservative methods of treatment, leads one to infer that much of the mucous membrane always removed during radical operation, would, if allowed to remain, regenerate. If there is doubt in the mind of the operator concerning the viability of mucous membrane, it should not be removed. It can do no harm, and even the smallest bits shorten the duration of the after treatment. By this method of treatment, one or two anterior ethmoid cells are always found that could not be reached through the nose. In large ethmoids there still remains another anterior cell

and some extending over the orbit that cannot be reached even by this method.

The mucous membrane flap may be made in two ways: An incision antero-posteriorly along the inferior edge of the attachment of the inferior turbinate is made; another along the floor of the antrum; these two are joined posteriorly. The flap thus formed is about one-half by one and a quarter inches. It is turned into the antrum and its tip sewed to the buccal mucous membrane in the line of the initial incision and near its median end. The second method is that used by Killian. It is made as follows:—The first incision is the same as the first incision of the other method—along the attachment of the inferior turbinate. From the anterior and the posterior ends of this incision, two short ones are made vertically downward to the floor of the antrum. The flap thus formed is turned down over the antral floor and held in position by one suture. The second flap is somewhat larger than the first, and is especially adapted to cases in which the anterior wound is to remain open, as the removal of the gauze packing through the nose is likely to loosen it. The packing in the antrum should be loose, arranged carefully, and when the initial incision is closed should be led by two strands well into the inferior meatus. Else it is removed with difficulty, and may even require a primary anesthesia. It should remain five days. Care must be taken to smoothe the edges of the bone opening to prevent the formation of exuberant granulations and possibly gangrene of the flap. The sphenoid should not be packed. If it is carefully wiped out at the time of operation, the hemorrhage from this point will generally be slight, and if it does occur, is safer to let it bleed than to fill the sinus with gauze.

The relation of the sinus to the optic nerve and brain is so intimate, its walls paper-thin, even containing dehiscences, that pressure upon the bleeding points of the small branches of the sphenopalatine arteries that nourish the lateral walls may cause the backing-up of blood, elevated pressure, permanent injury to the optic nerve, or even hemorrhage into the cranial cavity, as I have seen occur.

The after treatment consists of a judicious use of irriga-

tion, Politzerization and the dry method. Its duration is variable, and extends over a period of months, depending largely upon the care with which it is carried out. After the first ten days, the patient properly instructed and furnished with a suitable tube, can carry it out at home. Here, again, it is important to irrigate as infrequently as possible to assist the formation of new mucous membrane and scar tissue, and to prevent the formation of exuberant granulations. If these granulations form at the ostium of the sphenoid, they can be removed with a sharp spoon. In the most troublesome cases, they form in the antrum and may require even a re-opening of the primary incision. Despite this fact, in all cases where it is deemed possible, the anterior wound should be closed, else the antrum becomes merely a very slowly healing depot for the reception of infective material and food. There are cases of caries, perforation and malignant growth, where the wound must remain open. In these the healing is facilitated by the early application of large Thiersch grafts, the larger the better. Packing should be discontinued early, or as soon as the grafts have taken, the granulations kept down by silver, and the buccal wound closed with a plug of cotton. Even after the wound has entirely healed, a roll of cotton which can be changed at will, will generally be found to be more agreeable to the patient, and to cause less irritation to the mucous membrane than a hard rubber obturator.

Not only does an unclosed antrum serve as a receptacle for infective material, but it so often causes most unpleasant subjective symptoms, such as sensations of pain, cold, light-headedness and occasional vertigo which may persist.

The fact that cases of combined empyema of the antrum, ethmoid and sphenoid which resist careful, conservative treatment, are generally those with large atypical ethmoids which are difficult, dangerous and sometimes, even by this method, impossible thoroughly to eradicate, renders doubtful the prognosis for absolute recovery after even the most radical antral operation. These cells must be approached by another route—by an external operation generally through the frontal sinus.

Many different methods for operating upon the frontal

sinus have been advocated, but most of them have fallen into disuse. In the case of this sinus one should resort to radical methods with the greatest reluctance, and it is unfortunately here that the least can be done conservatively. In proceeding radically, one presupposes that every effort along conservative lines has been made, that neither the antrum nor the sphenoid is the cause of the continuance of the frontal disease, but that it must lie either in the frontal sinus itself or in the orbito-frontal or anterior ethmoid cells. The anterior ethmoid cells open either into the infundibulum or into the frontal sinus, and clinical experience bears out the statement that these are always infected together. The former is generally the source of the sinus disease. The operation chosen for the relief of this condition must be done to expose thoroughly both these areas. I shall consider three methods of procedure.

First. That of Hajek, whose object is to secure drainage of the sinus.

Second. That method by which the frontal sinus is to be obliterated by the formation of granulations and by packing.

Third. Killian's operation for the obliteration of the sinus without packing.

To consider the first briefly.

An incision is made through the soft tissues and periosteum passing through the eyebrow from its temporal to its median end. From the median end a second incision passes vertically upward to the superior margin of the sinus previously determined by the Roentgen ray. An osteo-plastic flap corresponding to the anterior wall of the sinus is then cut and turned back into the soft tissues. The entire mucous membrane is erased, bony septa removed and the walls of the sinus smoothed off. The naso-frontal duct is enlarged as far as possible, the remaining ethmoid cells are excavated and the sinus cleansed. A conical drainage tube is inserted into the opening between the sinus and the nose, and the wound saturated for primary union. The tube is to remain in place for at least three months, and is to be removed through the nose. It is as large as can be conveniently inserted, and sufficiently conical to hold it in position. From time to time during the after treatment it is gently drawn up and down

to prevent its becoming adherent. The object in this operation is, of course, to prevent deformity and to preserve the sinus as well as to eradicate disease. In the first two he is generally successful. Deformity is practically absent; however, out of seven cases, he reports two recurrences at eight and nine months after the operation respectively, and while still under daily observation. These recurrences occurred unexpectedly and without symptoms. The other five cases are still recent, and are under treatment. Against this method of operating there is urged in the first place that the necessity of wearing the drainage tube for three months is decidedly unpleasant. Hajek claims that epidermatization takes place readily around it, and that any granulations may easily be controlled with nitrate of silver. Considerable contraction must surely take place, however, after its removal. Again, it would seem that the condition in the frontal sinus that existed before operation might again obtain. One of the chief causes of the chronicity of the disease is the deposit of small pockets of pus in the various irregular recesses of the sinus, their inspissation and subsequent formation of fibrous tissue septa. The resulting chamber-building prevents perfect drainage and tends toward recurrences. It is quite possible that with a wide communication with the nose, this reinfection and secondary chamber formation might again occur.

The second method, that in which granulation formation from the bottom is desired and packing to be the after treatment, may be carried out as follows:

First. An incision through the eyebrow from its tempora to its median end, curving downward over the frontal process of the superior maxilla and cheek.

Second. Frontal sinus entered through the anterior wall near the median line.

Third. Formation of a narrow linear incision through the bone from this opening along the supraorbital ridge to the external boundary of the sinus. This is easily done with a Doyen rongeur.

Fourth. Enlargement of the two extremities of this incision so as to receive the jaws of the two rongeurs, by means of which the frontal wall is broken off in the soft tissues to form the

osteo-plastic flap. The soft tissues and osteo-plastic flap are then held out of the way by a retractor, which must be managed with considerable care to prevent injury and possible loss of the bone flap.

Fifth. Removal of the floor of the sinus and inner wall of the orbit.

Sixth. Complete erosion of the frontal mucous membrane and eradication of bony septa.

Seventh. Curettage of the ethmoid.

Eighth. Inspection of the sphenoid.

Ninth. Careful cleansing of the sinus and insertion of iodo-form packing.

Tenth. Replacing of osteo-plastic flap and suture of the primary incision. The center stitch and gauze to be removed on the fifth to the eighth day. Packing is then carried out through the central third of the incision, the external and internal thirds remaining undisturbed.

By this operation, anterior ethmoidal and orbito-frontal cells that had escaped observation at the time of the radical antral operation are exposed. A free view of the infected sinuses is secured. Indeed, a more radical operation could scarcely be performed.

As to its after results.

First. Upon the eye. In a large per cent. of cases no evil effect is noted. On the other hand, in many cases more or less unpleasant conditions result. One symptom complained of is diplopia, which follows the complete or partial loosening of the pulley of the superior oblique muscle from its bony attachment. If temporary, this diplopia lasts from seven to fourteen days; it may be permanent. Another symptom is dimness of vision which may result from excessive lachrymation. This lachrymation is due either to ptosis and consequent faulty situation of the superior lachrymal puctum or to permanent induration at the internal angle, which presses upon the lachrymal duct. Another and more serious dimness of vision results from injury to the eye itself. This may be the result of an acute iritis set up at the time of operation by pressure upon the eyeball by the retractor. This iritis may run the usual course and disappear without sequellae or develop into a chronic condition, evidenced by no pain,

slight injection and considerable impairment of vision. Again, dimness of vision may be due to a condition which I have noticed in two cases of amblyopia following this operation. It is evidenced by a very slight injection of the nerve head and accompanying loss of its clear outline. Its fibers melt off into the retina indistinctly, especially upon the nasal side. Trouble, therefore, seemed a traumatic neuroretinitis. Vision in one case was $\frac{1}{30}$, in the other $\frac{1}{15}$. The refractive media were clear. The only abnormalities present were the ones described. In both cases the amblyopia had persisted two years.

Second. Cosmetic results.

Small frontal sinuses yield the best cosmetic results, for the osteo-plastic flap is smaller and any displacement consequently less noted. Packing also need be continued for a shorter time. Unfortunately, accidents sometimes happen to the bone flap at the time of operation or later. It may be lost wholly or in part. During the formation of granulation tissue and subsequent retraction, the upper edge may become adherent to the posterior wall of the frontal sinus and cause the lower edge to tilt forward. Both these accidents are difficult to prevent and naturally have a bad effect upon the cosmetic result. They may even require secondary or tertiary operations which do not yield brilliant results. Another unpleasant result, which sometimes occurs, is a permanent induration in the neighborhood of the inner canthus. This can be obviated slightly by gentle massage after the scar is firm. Again, continued packing of a wound so difficult to bandage properly, and where it is desirable to expose the eye at the earliest possible moment, renders infection very probable. I have seen cases most carefully treated, granulate nicely from the bottom and only after a couple of months found filled with pus. Such infection always makes an ugly scar.

Keeping the lips of the wound separated allows the lower lip to drop down and more of less pronounced ptosis of the upper lid to result. The longer the packing, the greater the chance for reinfection, for ptosis, for induration, the greater the depression and the wider the scar. The shorter the duration of the packing, the less firm the granulation, the greater the danger of recurrence.

There is to be urged in favor of this operation that it is radical and permits, as far as possible, the eradication of the diseased condition. Against it is urged that it requires months of observation, packing and treatment; that the cosmetic result is doubtful; that injury to the eye is possible.

There remains to consider the operation of Killian. Inasmuch as there exists nowhere in the literature a perfect description of its technique as it is now performed by him, I will describe it in detail.

First. Mark the line of incision with a sharp scalpel; incision begins at the temporal end of the eyebrow and is carried through it to the root of the nose, dividing the nasal section of the musculus quadratus in the centre of the frontal process of the superior maxilla. It ends in an oblique curve outward below the base of the nasal bone.

Second. Periosteal incisions.

1. This incision is made five to six millimeters above and parallel to the supraorbital margin. From the temporal end of the skin incision to the suture between the upper ends of the nasal bones.

2. The lower periosteal incision follows the course of the skin incision, beginning just median to the attachment of the pulley of the superior oblique muscle.

Third. Puncture the frontal sinus just above that piece of bone included between the periosteal incisions. Retract periosteum, chisel through the anterior wall of the frontal sinus, exposing but not perforating its mucous membrane.

Fourth. Determine the size of the frontal sinus by means of a probe moving between the bone and the mucous membrane.

Fifth. Excise the front wall of the frontal sinus completely.

Sixth. Erase mucous membrane.

Seventh. Remove the floor of the sinus without injury to the supraorbital margin. While doing this, the operator stands behind the head of the patient.

Eighth. Remove the frontal process of the superior maxilla, and the remaining part of the sinus floor. Remove the frontal process without injury to the nasal mucous membrane.

Ninth. Excavate the ethmoidal cells and sphenoid, if necessary.

Tenth. Make the mucous membrane flap from the uninjured nasal mucous membrane. At the edge of the nasal bone, perforate the nasal membrane by a pointed scalpel. By means of a probe-pointed scalpel, continue the incision upward and backward $\frac{1}{2}$ c.m. below the cribriform plate, then downward. This flap of the mucous membrane is turned outward and used to cover those parts of the wound facing the nasal cavity. This establishes a permanent communication between the frontal sinus and the nose.

Eleventh. Cleanse the wound with salt solution, dust with iodoform; suture the incision for primary union.

Twelfth. After treatment. Place the patient on the healthy side; forbid him to blow his nose. He must aspirate the secreted fluid of the wound. Daily dressings. By no means flush the nasal cavity.

Procedure for radical operation of both sinuses is the same, as for the operation upon one side. Begin by removing the front walls of both sinuses and remove the interfrontal septum.

To Illustrate Killian's Operation.

COMMENTS. The skin incision in this method is made with the greatest care and precision. It is very long, and to prevent deformity and to secure perfect coaptation, attention must be paid that corresponding parts are brought into opposition. To accomplish this, it has been suggested to make little nicks at right angles to it, after its course has been marked out by the scalpel. It is not necessary to shave the eyebrow. Its presence is a valuable landmark, and it can readily be disinfected. Stitch abscesses do not occur in the orbital part of the incision, but when present are found in the dependant portion. Care is taken not to weaken the bridge of bone between the periosteal incisions by undue pressure at the time of operation, as its displacement or loss is followed by marked depression and deformity. The periosteal incisions are made with exactness. The length of the lower one has recently been changed, as it was found that loosening of the pulley of the superior oblique muscle some-

times occurred when the line of incision extended clear to the temporal end of the skin incision as it formerly did. Beginning as it does now, median to the attachment of the pulley, it has no such effect. Attempt is made in all cases to prevent the puncture of the mucous membrane of the frontal sinus as long as possible. The size of the sinus can be made out by means of the probe passed along under the bone, but outside the membrane. Unnecessary infection of the sinus cavities and wound edges is thus avoided. The anterior wall of the sinus is thoroughly removed. Any overhanging edges are taken away, and left perfectly smooth, as in persons with transparent skins and deep sinuses the edge is for some time plainly seen. Attention is paid to the most thorough erosion of the mucous membrane of the sinus, including the under surface of the bone flap. By standing behind the patient while removing the sinus floor the pulley of the superior oblique is avoided. Even though the bone flap is left in position the ethmoid and sphenoid are as readily accessible by this as by any other method. The formation of the flap from the mucous membrane of the middle turbinate and the lateral wall of the nose is important, as it assists materially in preventing formation of exuberant granulation and shortens the after treatment. Atropine is instilled into the eye at the close of the operation as a prophylactic against iritis. In this operation also especial attention must be paid to the eye. Pressure against the eyeball is to be avoided as far as possible. I think the narrower the retractor the less the danger to the eye. The cosmetic results, as far as I have been able to see, have been very satisfactory. Below the bone flap there is absolutely no depression. If no stitch abscesses occur the scar is very slight. The bridge of bone prevents loss of contour of the orbit. Removal of the entire sinus floor allows the orbital fat to push upward so as to fill the depths of the sinus. The question arose in my mind whether this change in the orbital pressure might not cause some anomaly in the tension of the extraocular muscles, but careful test of one case showed no heterophoria.

There is for several days after the operation more or less flat depression above the supraorbital bridge. However, by the formation of new granulations and the pushing upward

of the orbital fat this is but slight and grows steadily less. If it remains noticeable it can be relieved by a subcutaneous injection of paraffin.

The statement that Killian makes that he cures his patients without deforming them seems justifiable. The after treatment is very simple. For several days the serous contents of the wound is expressed into the nose and aspirated backward by the patient. During this period of convalescence he is not allowed to blow his nose, lest he fill the wound cavity with the mucopurulent secretion of the nose, or possibly cause an emphysema.

Finally the posterior surface of the soft tissues becomes adherent to the posterior frontal sinus wall. When this has taken place the patient may be considered to be more definitely healed than if his sinus were filled with a mass of granulations. After a few weeks a probe can be passed through the nose into a small cavity about the size of a hazel nut. The frontal sinus itself is completely obliterated.

CONCLUSIONS.

I have permitted myself to draw the following conclusions:

Conservative methods are successful nine out of ten uncombined cases.

Conservative methods should always be given a thorough trial before recourse is had to radical ones.

Uncombined empyemas are not uncommon.

Difficulty in healing is not always in direct portion to the duration of the disease.

Drainage of the antrum is secured most satisfactorily through the nose.

The ethmoid is the chief cause of the chronicity of obstinate combined cases.

The sphenoid is readily accessible through the nose in a large per cent of cases. It can be probed in 90 per cent. of cases by the method advised.

The establishment of free nasal respiration is an important factor in securing permanent results.

The radical operation should be resorted to infrequently.

The best radical antrum operation is the modified Luc-Caldwell.

The best frontal operation is that of Killian.

Frontal sinus operations not closed at the time of operation cause deformity.

Great care must be taken of the eye at the time of the frontal operation.

Accidents to the eye are:

First. Loosening the pulley of the superior oblique, causing diplopia.

Second. Dimness of vision due to:

First. Extraocular causes—lachrymation, conjunctivitis.

Second. Intraocular causes—iritis, neuroretinitis.

DISCUSSION.

Dr. C. C. Coakley, New York:—Discussing the cases of sinus disease presented by the Chairman, Dr. Richards, he has to be congratulated upon the excellent results obtained and the comparatively inconspicuous scar. The first case, that of an elderly gentleman who was cured by intranasal operation alone, is an example of what results when the drainage from a sinus is made perfect. But few chronic cases, however, can be cured by a procedure so simple, although it is always worth trying. We believe that the chances of cure depend upon two factors, both of which are unknown. One, the extent of the diseased mucous membrane, and the other the anatomic configuration of the sinus. If the mucous membrane is only moderately hypertrophied, then efficient drainage frequently results in a cure. On the other hand, if the mucous membrane is intensely edematous and polypoid in character, and the cavity so placed or divided by septa that drainage cannot be made perfect, then an external operation only can effect a cure.

The removal of the entire middle turbinate is not necessary for establishing drainage through the naso-frontal duct. It is usually only necessary to remove the anterior third of the middle turbinate. However, one must not forget that

the naso-frontal duct occasionally opens much further back in the middle meatus than commonly found. In a case operated upon about ten days ago, I found the opening of the naso-frontal duct $1\frac{1}{4}$ inches posterior to the vertical plate of the frontal bone. In this case, the anterior half, at least, of the middle turbinate must have been removed to free the lower opening of the naso-frontal duct. Of the cases shown, which have been operated upon by the removal of the orbital plate of the frontal bone, some have been cured, and one still has a fistula leading into the frontal sinus. The scars in these cases are very well situated to minimize the deformity. It seems hardly possible, however, that one can reach all the recesses of the frontal sinus through such a method of operating. This must be so if the sinus is large. I have, therefore, seldom had recourse to opening a frontal sinus through the orbital plate, preferring to operate through the vertical plate of the frontal bone. The radical operation demands the removal of the entire mucous membrane of the frontal sinus, so that the cavity may fill up with connective tissue and be obliterated. Any shred of mucous membrane that remains in the cavity is bound to keep up its secretion. For this there must be an outlet—either through a fistula in the line of the incision, or, else, through the naso-frontal duct into the nose. In either of these cases—although the patient may be greatly benefitted—we cannot consider that we have made a cure.

I want to express my hearty appreciation of the very admirable paper read by Dr. Canfield. I know of no short paper in which so much good material can be found as in that we have just heard. It would be very difficult for me to discuss all of the valuable points he has touched upon, in the time at my disposal. I think the Doctor has explained very well—what some of the rest of us have believed—in regard to the drainage from the accessory sinuses. Undoubtedly, the currents of air, passing in and out of the nose, do exhaust and suck out some of the secretion from the accessory sinuses, and thus materially aid in effecting a cure in both acute and chronic cases. There is, however, another factor of which he did not speak, namely, the act of blowing the nose. This compresses the air in the accessory cavities

thus forcing out the secretion. Anyone who has irrigated the nose until the nasal chambers are free from pus and asked the patient to blow the nose, will have noticed the secretion that is forced out by the compressed air in cases of diseases of the accessory sinuses. Dr. Canfield intimated as much when he gave an account of Jansen's instruction to the patient about not blowing the nose after being operated upon, but hawking it down through the naso-pharynx.

If I understand the Doctor rightly, catheterization and irrigation of the sphenoidal sinus were seldom possible. Up to two years ago, I thought the same way. I was always seeking—by inspection—to find the opening of the sinus. Those which were wide open I could get into quite easily. I found that, by taking a probe and feeling around in the neighborhood of the normal orifice on the anterior wall of the sphenoid, it was very easy to locate and enter the orifice. The only thing which markedly interferes are atresias between the middle turbinate and the septum. It is not nearly so easy to operate on the sphenoidal sinus as it is to catheterize it. It is far easier to enter the sphenoid sinuses through its normal than it is to enter the orifices of any of the other accessory sinuses. There is one thing of which Dr. Canfield speaks, and which I highly commend, and which many have overlooked in their zealousness to operate and that is, the freeing of the nasal cavities of hypertrophied mucous membrane and polypi, and, also, determining just how many of the sinuses are involved. One is often surprised to find how much can be done for patients if polypi are removed and the ethmoidal cells curetted intranasally. While it may be impossible to open each and every ethmoidal cell, the majority can be reached in this manner. Do this before you operate on the antrum or the frontal sinus and if the patient does not get well, then perform the radical operations. The operation on the frontal sinus which I have been doing, is one which results in the obliteration of the cavity and it has been successful, thus far, in every case. The incision is made through the eyebrow, $\frac{1}{4}$ of an inch above the supraorbital arch, periosteum peeled upward and so much of the anterior wall of the frontal sinus is removed by chisel and forceps, as to reach each and every part of the

frontal sinus. It is not necessary to remove all of the anterior wall to do this, but yet sufficient must be removed to make certain that no incomplete septa hide any diseased mucous membrane. The mucous membrane is then removed in its entirety until we have a bare, bony cavity; the last portion curetted should be the naso-frontal duct in order to prevent the blood passing into the nose and naso-pharynx. The cavity is then lightly packed with iodoform gauze, the outer half of the wound sutured, and a piece of the gauze allowed to protrude through the inner angle of the wound. No drainage tube or gauze is inserted through the naso-frontal duct into the nose. The gauze is removed at the end of a week, and, without irrigating, the cavity is again re-packed. This performance is repeated every three to five days until, each time inserting a smaller amount of gauze, the frontal cavity is filled up and obliterated with connective tissue. Healing is accomplished in from four to six weeks—occasionally a little longer.

The Killian operation on the frontal sinus is familiar to us through his own writings and those of others. Dr. Canfield's description of his latest modification make a most valuable contribution to this subject. The fault I have to find with Killian's operation, as he originally described it, is the placing of a drainage tube from the frontal sinus to the nose. This leaves a channel for future infection, which is fatal to any capacity lined with connective tissue. So far as the deformity is concerned, it is seldom possible to predict its amount. When asked about it, I reply that the deformity will depend upon the size and formation of the frontal sinus, and that I know of no way of predicting, before the operation, these factors. Transillumination may give us some idea of the size of the sinus, but it cannot be relied upon too implicitly.

Dr. F. C. Cobb:—I have listened to this paper with great interest and have to thank the writer for so comprehensive a review of the subject. The questions involved in frontal sinus operation make it worthy of our most thorough study. In Boston the operation which has found favor has been the one which Dr. Richards has shown us here today. Where failures have occurred it has been from the gradual cicatri-

zation and contraction of the nasofrontal duct. Luc, the originator of the operation, has himself abandoned it in favor of the Killian which the reader has so well described. The Killian operation is not however without its disadvantages, in which must be reckoned the danger of interference with the eyesight. After the anterior wall of the sinus has been removed and the ethmoid is opened, then the upper wall of the orbit must be removed. To do this without injuring the pulley of the superior oblique muscle of the eye is not always an easy task. The most painstaking removal of every bit of diseased tissue and bone is necessary and any lapse means a second operation. Recurrence with any known operation will occur and only time and experience can show us the one least liable to this disadvantage. Where the frontal sinus alone is involved the operation of Dr. Coakley offers great advantages. The long duration of the after treatment is a disadvantage but the resulting scar is not marked and the prospects of recurrence are small, if any. What we need most it seems to me is a frank statement of the disadvantages as well as the advantages of each operation by operators having experience with that operation.

Dr. Clark:—I have had no experience with the very radical operations on the sinuses, Killian's and Jansen's, which have been spoken of today. I would like, however, to take this opportunity to emphasize what Dr. Coakley has said in regard to thoroughly cleaning out the nose before making up one's mind to resort to a radical operation. This is a very important point. Let us be conservative and careful not to be carried away by the desire of doing a brilliant operation from a consideration of what may be best for the particular patient before us. It goes without saying that the less operating we can do and attain a successful result the better for the patient. I have in mind a case which is now under my care. The patient, a woman 35 years old, has had profuse purulent discharge from the left nostril as long as she can remember. I began by clearing out the ethmoid region, at the same time frequently washing out the antrum, which contained pus. As soon as I got rid of the middle turbinate and the ethmoid cells, I found that the sphenoid sinus

also contained pus. The patient is now very much relieved, using only one or two handkerchiefs a day, when she had formerly used seven or eight. The only source of pus now is the frontal sinus and the amount is very small. I am able to probe the sinus from the nose, follow it up with a small curette and then wash the sinus through a small canula with an antiseptic solution. The patient is anxious to avoid a radical operation and I am willing to persevere as I have been doing as long as there seems to be improvement. I will mention one other case which I operated on last summer, employing the operation that Dr. Richards has so successfully used on the cases he has shown here today. This patient had very severe headaches which have been entirely relieved. There is no longer any pus from the frontal sinus. At the time of the operation I opened the antrum through the canine fossa and found that apparently the mucous membrane was not diseased at all. Thinking, therefore, that the antrum was probably only the repository for the pus from the frontal I did not make a permanent large opening into the nose. This was a mistake as the antrum still secretes pus and I shall have to operate on it again. The frontal sinus is to all appearances well.

Dr. Coakley:—I desire to show some curettes which have been made in different sizes and shapes for removing the mucous membrane of the accessory sinuses. Most of the curettes on the market with which I am familiar, are made with more or less mallable shanks, and, when very much pressure is made on the handle for the removal of the mucous membrane, the shaft beds. I have had my curettes made with rigid right shafts, but of varying angles and shapes, in order to reach the various parts of the antrum and the frontal sinus. I have used them a number of times and find them to be an improvement over the Myles curettes or any of the straight variety.

XII.

THE IMMEDIATE RELIEF OF HYSTERICAL MANIFESTATIONS OF THE LARYNX.*

BY HANAU W. LOEB, A.M., M.D.

PROFESSOR OF NOSE AND THROAT DISEASES IN ST. LOUIS UNIVERSITY.

ST. LOUIS

Hysterical manifestations in the larynx are common enough to fall frequently into the hands of every laryngologist. The treatment likewise is successful enough to warrant an almost positive promise of relief in at least the majority of cases. There is, however, much to be learned, both as to the development of newer and more satisfactory methods and as to the reasons for the successes in individual cases.

It is in view of these circumstances that I present my method which, though original with me so far as I know, may yet have been used by others. I do not assert for a moment that the method results in anything but a relief from the laryngeal symptoms or that monosymptomatic hysteria exists, and that, therefore, the symptomatic relief is tantamount to a cure. Nor is it certain that the relief is of any longer duration than that from other plans. But it is clear that the method is simple, absolutely painless, easy of application and withal successful.

All plans of treatment have as their basis the deception of the patient, or, perhaps I should say, direction of the patient's mind away from false conceptions toward possibilities that are within his reach if only he will utilize them. In other words, suggestion in one form or another is used. This may be extended over a period of time, or it may be so decided that it is effective at the first sitting. To the former class belong such plans of treatment as manipula-

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tions of various kinds and operations distant from the seat of the symptoms. Often, too, operative interference in the neighborhood of the larynx or applications to the larynx or pharynx will be followed by relief after a longer or shorter time. Consecutive treatment of any kind may have a similar effect in ridding the patient eventually of his symptoms. Immediate suggestion, on the other hand, is mainly used through the medium of a strong electric current which is sent through the larynx, and generally becomes effective at once.

The method which I desire to detail is of this type, but it requires no instrument except the index finger and a ready tongue on the part of the operator.

At the first sitting, having recognized the case as one of hysteria, I state to anyone who happens to accompany the patient that the case is quite clear and easily relievable, but, turning to the patient, I say: "You must agree to let me do what is necessary. I can not consent to undertake the treatment unless you are willing to submit yourself to the treatment." The patients invariably say that they are willing to stand anything provided there is any likelihood of a cure. Of course, I give an absolute promise as to relief and send the patient home to think and to worry about it, or, if it is desirable, proceed at once to work. In any event, I generally deliver a short and more or less sentimental talk to aphonics on the word "home," which I state is the first word that they will utter, the most beautiful and easiest to pronounce in the English language. Having secured the requisite confidence and interest, I place the patient on a chair and I insert the index finger of the right hand into the pharynx and press the epiglottis over the glottis until the patient becomes somewhat uncomfortable, when I withdraw my finger and say in a loud commanding voice, "Now, say 'home, home, home!'" The patient responds and the command is continued as often as necessary until the patient repeats not only "home," but any word suggested, and leaves the office talking as well as anyone. At the next sitting I look into the larynx and state that everything is in perfect shape and the treatment concluded.

Of course, the character of conversation must be modified

as the requirements of the individual demand, but in the main the procedure above indicated may be adopted.

In my earlier cases I stated that there was a dislocation or defect in the larynx which my treatment would relieve, but I now make no statement of what I affect to discover in the larynx in consequence of the advice given to me by Dr. Schwab. He called my attention to the fact that hysterics are prone to adopt suggestions to their own detriment, although the suggestion be made for their relief. In two of the three relapses the error of this plan was shown. In the first case one of my patients (which one, I do not know) called on my assistant during my absence in Europe and said that she had another dislocation in her throat and that I had cured her before by sticking my finger down her throat and invited him to do the same. He did so, and she became phonic again.

In the other case, that of hysterical mutism, the recurrence, I am sure, was made possible by my error in detailing the supposed cause.

The cases to which the method has been applied cover the whole range of the commoner hysterical manifestations of the larynx, such as aphonia, mutism and cry. The result was in every instance successful except in one not reported were for the reason that I did not have a fair opportunity to do the necessary work. The case was one which I saw for a few moments only in the office of Dr. Freudenthal of New York during a visit to that city. The case was a very obstinate one, having been the rounds of laryngologists without benefit. The Doctor had been unable to relieve her, and asked me to try my plan. Of course, I could not and did not secure the patient's confidence and, therefore, nothing resulted.

The cases which I report will fairly demonstrate the variety of conditions that may be relieved and likewise the method of applying the suggestion. Of course, in every instance, I explained the nature of the condition and the character and true facts of the treatment to some sensible member of the family. To do otherwise would have placed me in the ranks of the charlatans. The responsible member of the family is entitled to know that there is no real operation,

and that the method used is purely one of suggestion. It is best, generally, to postpone giving this information until just before resorting to the suggestion. Of course, it is necessary to enjoin the informed not to let the patient know the true facts and not to discuss the condition with the patient or friends.

General treatment is indicated in all these cases, especially such as may influence the hysteria, which is the basis of the condition that causes the patient to consult a laryngologist.

SUMMARY OF CASES.

CASE 1.—*Hysterical Aphonia, Paralysis of Adduction.*—My first case was that of a girl, aged 17, who came to my clinic suffering from the classical symptoms of hysterical aphonia. After showing her to my students and demonstrating the hysterical paralysis of adduction, I endeavored to pursue the usual plan of sending a current of electricity through the larynx. My battery was out of order, so being at a loss for an agent with which to influence the patient, it occurred to me that I might accomplish the same result by suggesting that something was dislocated in the larynx which I could easily replace and thereby accomplish a cure. Somewhat to my surprise the patient recovered her voice as soon as I withdrew my finger and announced that everything was in proper order again.

CASE 2.—*Hysterical Aphonia, Adductor Paralysis.*—In January, 1900, I was asked by Dr. Jacob Geiger of St. Joseph to see a young girl, E. B., aged 13, who had been suffering from aphonia for six months. This had come on suddenly and had not yielded to treatment, which had been, in the main, nerve and blood tonics and sprays. There was no previous history except an attack of acute rheumatism some years before. The girl was of a very lively, nervous disposition, very capricious and somewhat anemic. Having learned of the case beforehand, and readily recognizing the condition, I had sent word to the mother that her daughter would speak within two minutes after I saw her. As a consequence of this the patient was prepared for something ex-

traordinary. I made a hurried examination and confirmed the diagnosis and stated to the patient that if she were willing to submit herself to the treatment, however severe it might be, I would have her saying "home" in less than a minute. She consented. I adopted the usual plan, and withdrawing my finger suddenly, commanded her to say "home, home, home." She did so, and acting on my direction she called up her grandfather by long-distance telephone and within three minutes after I saw her she was talking to him in proper voice for the first time in six months. There has been no recurrence, as I learned from Dr. Geiger, under whose charge the patient now is.

CASE 3.—*Hysterical Aphonia, Adductor Paralysis, Anesthesia of the Pharynx, Hysterical Cough.*—The father of A. B. had written to me in May, 1900, from Louisiana describing his daughter's condition. He stated that she had lost her voice suddenly eight weeks before, and since that time could whisper, but not phonate. He asked me to telegraph if I could relieve her. Knowing well what the effect would be on the young lady, I telegraphed to him that I could cure his daughter. As I surmised, when she arrived she was perfectly satisfied that I would cure her, and I had little difficulty in making her have full confidence in what I promised. As usual, I advised her that the operation which I should perform would necessarily be a severe one. She stated she was willing to stand anything. Unfortunately, a well-disposed patient, who became acquainted with the one whose case I am reporting, assured her in a sympathetic way that the operation would not be painful and that she need not have any fear. To this I lay the necessity of making three efforts before I was successful. I found the patient, when she came into my operating room, very much calmer and not disposed to fear the operation. After I withdrew my finger the first time her voice was slightly more phonic. Looking into her throat I stated that the cords were not in proper position. I made another effort, this time with more success, for now she spoke in a rather hoarse but fairly phonic way. After examining the larynx I stated that it was almost in the exact position which I wished it. The third effort was successful. Since that time there has been no

return whatever. Curiously, after the disappearance of the aphonia she developed a hysterical cough, which, however, lasted only a few weeks. Dr. Bauduy, who examined the case, confirmed the diagnosis of hysteria. The mother was intensely hysterical, and immediately after the young lady's voice returned I isolated her from her mother for three days, fearing the effect of her sympathy and the maternal hysteria. In this case during the attack the cords could not be approximated, during the efforts at phonation the space between the arytenoids being fully 7 millimeters. Anesthesia of the pharynx was marked.

CASE 4.—*Hysterical Aphonia*.—F. M., aged 22, first lost her voice suddenly in September, 1900. One week later it returned suddenly. Two weeks after this the voice again disappeared suddenly and reappeared within one week. The last attack came on a month before she consulted me, which was on Dec. 18, 1900. This attack differed somewhat from the other in that she could not even whisper at first, but a week before she began to whisper again. There was no pain, no discomfort and no globus hystericus. Her general health was good, but she was somewhat anemic. Previous health had been good. I made an examination, stated that there was a condition in her larynx that required immediate attention, lectured to her on the easiest word in the English language, namely, "home," assured her that this would be the first word she would speak, and having thoroughly frightened her secured her consent to go through the necessary performance on the following day. She returned very much worried, very much interested, and determined to undergo anything to recover her voice. The usual plan was adopted and her voice returned immediately, and there has been no recurrence of the aphonia since.

CASE 5.—*Hysterical Mutism, Adductor Paralysis, Hemianesthesia, Anesthesia of the Pharynx*.—I was consulted in November, 1900, by Mrs. M. G., a widow, aged 41, who presented the following history: In February, 1899, an operation was performed on the right axilla. After this she remained in bed for four months. July 1 she found it impossible to phonate, her voice becoming suddenly of a whispering type. Aug. 2, 1899, her voice was lost altogether, it being impossible for

her even to whisper. Since that time she had been unable to phonate or to whisper. She stated that she had never been able to speak in a loud tone since the operation, and evidently ascribes her trouble to the operation. There was no definable cause for either the whispering or the attack of mutism. She states she had a choking sensation, after which her voice disappeared. Her mother died of consumption when the patient was 5 years old. Her father died in the army from a wound. There was no nasal discharge and there were no symptoms of throat trouble, except that she complained that her throat felt sore on the right side (the side on which the operation was performed). She had frequent attacks of headache of the migraine type, both sides being affected. The attacks came on without any special regularity. There was no cough, no expectoration, no clearing of the throat. Her appetite was fair; her bowels regular; no difficulty of respiration; occasional choking sensation at night; general condition fair. Both Dr. Chaddock and Dr. Schwab, who examined this patient at different periods, found unmistakable evidence of hysteria and numerous stigmata, such as hemianesthesia, anesthesia of the pharynx, etc. The patient, who had been suffering from mutism for 16 months, was brought before my class, giving me an occasion to make a distinct impression on her as to the seriousness of her condition, the possible severity of the operation and the beautiful influence of the word "home," the first word which she learned she was to speak in 16 months. Of all the patients whom I have treated in this way she was most affected. She responded at once to treatment and her voice returned. On Sept. 25, 1902, she again consulted me on account of the loss of voice of two days' duration. I found a very acute inflammation of the pharynx, tonsils, lingual tonsil and larynx. The usual remedies were applied, and though the acute inflammation disappeared the aphonia continued. It was evident that she remembered her previous attack, and was probably influenced by a fear that there had been a second dislocation in the larynx. Not desiring to complicate the matter, as it was evident that suggestion in this case had as much power for evil as for good, I concluded to use another method in this case. Con-

sequently I made an application to the lingual tonsil of a strong solution of nitrate of silver, having stated to her without undue explanation that she would be enabled to talk immediately thereafter. Success followed this application.

CASE 6.—*Hysterical Aphonia, Hoarseness*.—Miss M., aged 24, consulted me in December, 1900, on account of her hoarseness, which had lasted for six months. Two years before I had endeavored to relieve her of hysterical aphonia by galvanization with but indifferent success. She could phonate at times, but her voice was always hoarse, while she had occasional relapse into complete aphonia. Her general health was fair, though she was nervous and disposed to be melancholia. One sister suffered from melancholia for two years but finally recovered. Examination showed that the vocal chords did not approximate when phonation was attempted. The usual plan was followed, and although such a case could not offer the same promise as one of complete aphonia, the patient entirely recovered and has continued free from trouble except occasional attacks of hoarseness, which, however, last but a short time.

CASE 7.—*Hysterical Cry*.—I. S., aged 13, consulted me in April, 1901, at the instance of Dr. B. L. Dorsey, with the following history: She had been more or less sick all winter with what was designated nervous prostration. Other than this there had been no trouble except painful spots along the right leg. About three months previous to this time the peculiar shrill cry first appeared and within the limits of its characteristics it had continued since that time. The cry did not appear until 4 o'clock in the afternoon (after school) and it continued at intervals of from one and a half to two minutes, until she went to sleep. From that time until the succeeding day at 4 o'clock she was free from its presence. The cry, which lasted about two seconds, resembled the sound of a prolonged *ai*, and the intensity was about that of the voice of a child when calling another at some distance away. The quality, duration, pitch and intensity, so far as I could observe or learn, were about the same under all conditions, whether the child was on the street or in the house. The girl was very much mortified about her condition, and strove to conceal it, manifesting great disinclination to leave

home. Examination of the nose, pharynx and larynx showed nothing abnormal. Dr. Chaddock found stigmata of hysteria, which naturally confirmed the diagnosis. Although this case hardly afforded the scope for suggestion after the method detailed that the aphonic cases offered, it was finally decided to adopt the same plan. Accordingly, after the usual preliminaries and after being assured by the patient that she was willing to stand anything which would afford relief, I inserted my finger into the larynx until she became very uncomfortable, and withdrawing it suddenly I said, "Now you are all right!" I then examined her larynx and stated to the doctor and mother that everything was now perfectly normal. Since that time she has never had a single attack. I saw her last in March, 1903.

CASE 8.—*Hysterical Aphonia, Anesthesia of Palate and Pharynx*.—Miss E. P., aged 27, referred to me by Dr. F. J. V. Krebs, Dec. 1, 1902, lost her voice six months ago. Two months later, without apparent reason, her voice returned. Two months later it again disappeared, and since that time, although much has been done to relieve her, the aphonia persisted. The patient's health had been fair, but she was nervous and easily excited. On attempted phonation the cords would move spasmodically to and fro with a short range about 5 millimeters from the median line and would finally come to rest in the position of complete abduction. Palate and pharynx were anesthetic. After the usual preliminaries I inserted my finger into the larynx and withdrawing it, I ordered her to say "home, home, home!" She responded in a fairly loud voice. As I continued to direct her to say this and other words, I noticed that there was still a tendency to aphonia in that she would quite often whisper the word instead of saying it aloud. I then asked her to sing, "Home, Home, Sweet Home," and with the assistance of my own somewhat discordant tones she sang the song and the aphonia left her. Three months later there was a recurrence, which readily responded to my suggestion which comprehended an inspection of the larynx, an expression which indicated that I understood the condition and the introduction of the finger without comment. Since this she has had no further attack.

XIII.

A CASE OF PRIMARY INVOLVEMENT OF THE JUGULAR BULB, FOLLOWING AN ACUTE OTITIS MEDIA, WITH OPERATION AND RECOVERY.

By J. F. McKERNON, M.D.

NEW YORK.

The case was that of a two year old girl, with a history of earache for two days. Examination showed the usual signs of an acute otitis media in both ears, more intense on the left side, with no mastoid symptoms. The left membrane was unusually prominent at the junction of the inferior wall of the bony canal near the tympanic ring.

Both drums were incised, pus escaping from left middle ear, serum only from the right ear. The pus contained a few streptococci, and pneumococci; the serum, staphylococci, and an occasional pneumococcus. Both ears discharged freely and the patient did well until the following evening when the temperature suddenly rose to 103.2 F. Several rises in temperature, with remissions to 98.4° or 100° F., occurred in the next forty-eight hours, and permission was asked to operate. This was refused on the ground that the temperature might be due to malaria, typhoid or pneumonia, and the unlikelihood of sinus trouble, in the absence of mastoid symptoms.

Blood examinations now gave a negative result as to malaria and typhoid, but showed a marked leucocytosis, and the presence of streptococci. Streptococci were also found in smears from the aural discharge. Exacerbations of temperature continuing, and the child becoming frankly septic, and vomiting, operation was done at the end of 5 days. The left mastoid was first opened and found unaffected; the dura, over the sinus was dark and lustreless; the sinus was easily compressible and did not fill as rapidly as it should. Incision into the sinus was next made and a parietal clot, one-

half inch long removed, this being followed by free hemorrhage from the distal end, no current coming from below. Incision was continued to the bulb, and a well formed clot over an inch long, and as thick as an ordinary slate pencil, extracted. More broken down clot enveloped in pus was then removed with a wire curette. No bleeding occurred until a probe found the opening into the jugular vein, dislodging a clot in the foramen, when a sharp hemorrhage followed. The jugular bulb was kidney shaped, higher than usual, and encroaching on the middle ear cavity.

Exploration of the right mastoid showed it also to be normal, as was the sinus, which was therefore not opened. Recovery was uneventful, from the moment the poison was eliminated. Hearing normal.

Microscopic examination of the clot showed a large number of small pus foci, but no bacteria. Culture from same material showed a decided growth of *treptococcus pyogenes*.

Two other similar cases have been seen by the writer since the above report. In none of these was there evidence of a chill, the only symptoms, besides the acute otitis, being temperature, which was typical of sinus involvement in all.

The author concludes, that with an active, virulent infection of the middle ear, and a large, irregularly shaped jugular bulb encroaching upon it, and these two spaces separated only by a thin, parchment-like wall of bone, it is easier for the infection to pass through this thin partition than by the usual channel, viz: the mastoid. The internal jugular vein was not ligated and resected because free circulation was restored without this measure, and the shorter the time of operations, the better the chances of the patient will be. Results are also better if operation is done during a remission than during a period of high temperature—then there being more reactive power, less depression and more rapid convalescence.

XIV.

LARYNGITIS HYPOGLOTTICA ACUTA *

BY CHARLES W. RICHARDSON, M. D.,

WASHINGTON, D. C.

There has been no subject in the range of medicine to which I direct my attention that has been so interesting a study to me as that known as laryngitis hypoglottica. This affection occurs in adults as well as in children, but it is rather to the condition as affecting child life that I would in particular direct your attention. Laryngitis hypoglottica is used to designate that more intense form of laryngeal inflammation in which the submucous structures of the larynx participate most actively in the morbid change; frequently showing infiltration, producing swelling into the lumen of the larynx. Those regions of the larynx rich in submucous connective tissue, as the ary-epiglottidean folds, the false cords, and in particular the immediate subcordal portion of the larynx are the areas most frequently affected. The peculiar tendency of this disease to develop the subcordal infiltration with the accompanying impairment of the respiration makes it not only a pathologic condition of great interest, but also alarming in its clinical features, as well as fraught with danger to the life of the affected one. The hypoglottic form of laryngitis as affecting children rarely becomes of much moment when affecting the submucous tissue of the supracordal portion of the larynx. It is only when the condition affects the loose areolar tissues in the subcordal portion of the larynx that our anxiety and fears become aroused. From this fact I have always been inclined to accept the French designation, laryngitis submucosa subcordalis, as the more appropriate term. The etiologic factors, which seem to bring about this condition, are those atmospheric changes that cause acute laryngitis; the acute exanthemata, especially

*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society, Pittsburgh, Feb. 22, 1904.

measles; influenza; foreign bodies; chemical fumes; inhalation of steam, hot air and smoke. The predisposing cause seems to be that condition described by Potain, and known as lymphatism. Males seem more frequently to be affected than females.

The pathologic changes are characterized by intense inflammatory redness of the affected portion of the larynx, and partial or diffuse, either unilateral or bilateral swelling of the affected portion of the mucous membrane. The effusion into the submucosa seems to be of a highly coagulable nature. It is rarely that the whole larynx is affected.

Symptoms.—The acute hypoglottic type appears primarily under the usual symptoms of a severe acute laryngitis. There is more or less disturbance of the voice, croupy cough, and slight stridulous breathing. In children there is slight acceleration of the pulse, increase frequently of the respiration and a moderate rise in the temperature. As the case progresses the breathing becomes embarrassed and the stridor more pronounced. In the supracordal cases the symptoms rarely go beyond this point of moderate embarrassment of the respiration and audible in and expiratory murmur. In those cases, though attended with subglottic infiltration, the breathing becomes more and more difficult, the inspiratory and the expiratory stridor more piping and higher pitched, the cough more frequent and of a more metallic character. All the extraordinary muscles of respiration are called into play, and there is a sinking in of the epigastrium and at the suprasternal notch during inspiration. The child's anxiety and distress are manifested in the usual manner. Cyanosis rapidly supervenes and the pulse becomes small, rapid and thready. Unless relief is afforded at this stage through subsidence of the swelling by natural resolution or through mechanical means the process leads to a fatal termination.

The laryngeal picture presented, when such a view can be obtained, varies according to the affected area. In the supracordal type there is an intense deep redness of the mucosa, while when the false cords are the seat of infiltration, they bulge out so as nearly or quite to overlap the true cords; or when the ary-epiglottidean folds are the seats of

the inflammatory activity they show a greater or less increase in dimensions. In the subcordal type the picture is even more strikingly characteristic. The supracordal laryngeal mucosa seems to participate but slightly in the pathologic change when the subcordal mucosa is involved. Often the cords themselves only show a slight pinkish tinge. On a deep inspiration during inspection the characteristic lesion will show up as two intensely red folds of mucosa, apparently immediately beneath the vocal bands, which are thoroughly immobile during inspiration and expiration. These folds of mucosa vary in size from a slight raising of the mucous membrane, hardly discernible, to masses that almost or quite come in apposition in the middle line. I have, in older children, several times been able to obtain most perfect pictures of the above mentioned condition.

The differential diagnosis between this condition and laryngeal diphtheria is one that cannot always be immediately made. There are slight shades in the subjective symptoms, but they are not constant. In diphtheria the voice is more apt to be very hoarse or aphonic than in hypoglottic laryngitis. In at least six cases I have heard the voice almost normal in hypoglottic laryngitis. In diphtheria the obstruction to breathing is more frequently attended with paroxysms of intense dyspnea, followed by periods of easier respiration. In hypoglottic laryngitis the breathing is not paroxysmally worse, but gradually and progressively grows worse. Laryngeal examination, if possible, shows the characteristic deposit of diphtheria in one form, or the presence of the subglottic swelling in the other. The presence of pharyngeal deposits, when a view cannot be obtained by the laryngeal examination, simplifies the differentiation. The result of a culture will demonstrate the absence or presence of the Klebs-Loeffler bacillus.

Treatment.—Treatment consists in the administration of expectorants, free purgation, the application of ice bag externally, the generation of steam in the room, and the local application or spraying into the larynx of a mild solution of silver one per cent. and suprarenal extract. Should the embarrassment of respiration become great, or the child show exhaustion from the prolonged effort of breathing,

intubation or tracheotomy becomes necessary.

It has been my experience to meet with quite a number of these cases, and in closing my paper I will give briefly the history of several, divided arbitrarily into types, enumerating one of each kind.

CASE I. A six year old child, not requiring mechanical interference, referred to me by Dr. H. B. Deale. The boy had had an ordinary acute laryngitis which had been attended with slight stridulous breathing. On the third day of the invasion, as the stridor had become worse instead of better, he was referred to me for opinion. The boy had no temperature. His general condition was excellent. He had a high-pitched inspiratory and expiratory stridor, which was distinctly audible in quiet respiration forty feet distant. Cough distinctly croupy. Voice normal. Laryngeal inspection gave the most perfect picture of subglottic swelling I have ever seen. Several applications of silver resulted in perfect resolution.

CASE II. An infant child, not requiring mechanical relief. Seen in consultation with Dr. S. S. Adams. This infant had been sick for several days with a laryngitis and continuous stridor. The stridor had persisted for the twenty-four hours preceding the consultation, increasing slightly during the day over that of the night. The voice, as evidenced by its baby talk and cry, was perfectly clear. Cough croupy. Slight temperature. Inspiratory and expiratory stridor quite marked. Child bright and playful. No cyanosis or other evidence of want of air. Pharynx clear. No laryngeal examination possible. Usual treatment, with complete recovery in twenty-four hours. No culture made.

CASE III. A seven-year old girl, requiring mechanical relief, to whom I was called by Dr. R. T. Holden. This girl had had measles. During the convalescence the hypoglottic condition developed. For several days the breathing had grown progressively worse. There was croupy cough and a clear voice. Breathing was very distressing, markedly embarrassed, with cyanosis. Epigastric suprasternal and supraclavicular sinking. Immediate intubation. Child extubated in four days. Recovery. Culture negative.

CASE IV. An infant child, fourteen months old, with

pronounced general symptoms and requiring mechanical relief. I was called to see the patient by Dr. Fry. The child had had an attack of influenza, which had been followed by the evidence of hypoglottic laryngitis. Two days before I saw the infant the invasion of the larynx had taken place. The day before, the breathing had been stridulous and had grown worse that evening. Dr. Bryan saw the case with Dr. Fry the evening of the second day, and suggested the external use of ice. The child, instead of improving during the night, steadily grew worse. At noon the next day, on account of Dr. Bryan's illness, I was called to see the little patient. The little fellow was very much exhausted by his laborious efforts at breathing. He was cyanosed. There was a high-pitched inspiratory and expiratory stridor, croupy cough, and a slightly hoarse cry. There was marked sinking in of epigastrium and suprasternal notch. The child was restless and showed all the evidences of one craving air. Temperature was 101.2, pulse 160, respiration 40. Intubation was immediately done. The temperature curve, as shown by the chart, ran rather a high course. The child was extubated and the tube introduced on three occasions. On the twelfth day the tube was coughed out, and did not require further introduction. The child made a perfect recovery. Culture negative.

CASE V. A child of three years of age, demanding mechanical relief, with a fatal termination. I saw this child at the request of Dr. Mallan. It was after twelve at night that I was called to see the child with Dr. Mallan. The boy had been sick for several days with what appeared a simple laryngitis with slight audible respiration. During the twenty-four hours preceding my visit the breathing had become more and more labored. The child's condition demanded immediate relief, which was given through the introduction of an intubation tube. The voice was only slightly hoarse. In order to safeguard the child, antitoxin was also administered. Culture proved negative. Child died on the second day after intubation, from pneumonia.

XV.

TINNITUS AURIUM; ETIOLOGY.

BY W. SOHIER BRYANT, M.D.

NEW YORK.

CLASSIFICATION.

Tinnitus aurium may be due to any of the changes causing impaired hearing and to nearly all systemic diseases and abnormal conditions. For convenience in treating this subject the various forms of tinnitus may be classified under two main headings as follows: I. Objective Tinnitus, when the sound can be heard by the observer with and sometimes without auscultation. It is composed of (a) Vibratory Tinnitus, due to demonstrable sound vibrations. This is divided into (1) External Tinnitus, which has its origin outside the ear, and into (2) Internal Tinnitus, which originates within the ear.

II. Subjective Tinnitus is purely subjective in character and is divided into (a) Phonetic Tinnitus and (b) Neurotic Tinnitus. (a) Phonetic Tinnitus is divided into (1) Peripheral Tinnitus, which has its origin outside the ear, and (2) Aural Tinnitus, which originates within the ear. (b) Neurotic Tinnitus has no sound vibration and is divided into (1) Exaural Tinnitus, originating outside the ear, and (2) Endotic Tinnitus, which originates within the ear.

Under (1) External Tinnitus we have tinnitus due to abnormal and pathologically increased somatic sounds, which are divided into (a) Vascular Tinnitus, due to circulatory or vascular sounds. The causes are: 1. Cardiac disease (valvular lesion); II. Aneurisms of the thoracic vessels; of the basilar, middle meningeal, occipital, temporal, post-auricular, ophthalmic and carotid arteries (in carotid canal). III. Arterial dilatation of the vessels of the auricle, which may cause blowing sounds synchronous with the pulse. IV. Con-

striction of arteries, as seen in partial stenosis of of internal carotid (J. Orne Green), V. Constriction of veins; this is sometimes due to tight collars. VI. Tumors pressing on the vessels, as struma, also cicatrices. VII. Goitre. VIII. Abnormal blood tension or volume, including diminished vasomotor tension of the carotids. IX. Abnormalities in the bulb of the jugular or sigmoid sinus, causing eddies and vibrations in the blood stream. X. Roughening of the vessels, as in atheroma. XI. Abnormal composition of the blood; that is, anemia, with its venous murmurs and pure-nemia or lithemia.

Vascular tinnitus often occurs without defect in the sound conducting mechanism, when the vascular sounds are abnormally loud.

(b) Pharyngeal Tinnitus is due to I. Loud mucous sounds caused by the adhesive character of the secretion; snapping and sticky sounds following the separation of opposed surface. II. The pharyngeal muscles, causing voluntary or involuntary contraction noises. III. Friction sounds, due to rotating the head in dry pharyngitis.

(c) Respiratory Tinnitus is due to normal or abnormal respiratory sounds, and is divided into: I. Nasopharyngeal tinnitus, which is due to normal or abnormal respiratory sounds and sounds caused by the escape of a r. Normal respiratory sounds include sneezing and hawking. Abnormal respiratory sounds are due to lymphoid hypertrophies, new growths, morphologic irregularity of bone or cartilage, hypertrophy of the erectile bodies, adhesions, functional derangement of the erectile tissues with engorgement, functional derangement of the mucus membrane with thick inspissated secretion and extensive loss of tissue in the nose. Sounds caused by abnormal escape of air which comes through the lachrymal duct in atrophic rhinitis, or through a perforated drum membrane. II. Pulmonary tinnitus is caused by coughing, asthmatic sounds, rales and sounds due to partial closure and stricture of the larynx, trachea and bronchi.

(d) Muscular Tinnitus is due to: I. Sounds of mastication, especially snapping of the inter-articular cartilages. II. Sounds of the pharyngeal muscles and deglutition. III. Muscular contraction, myothonia and movement sounds of

other muscles near the ear. IV. Snapping sounds, due to movements of the muscles and articulations of the neck, and V. Snapping of the eyelids, an unusual muscular trick.

3. Internal Tinnitus is due to sounds originating in the ear, and is divided into (a) Tubal Tinnitus, due to sounds originating in the Eustachian tube, including: I. Tubal rales, which are made by air entering a tube containing secretion, exudation or foreign fluid, as salt water; with sticky and snappy sounds when the secretion is thick. II. Sounds due to movements of the muscles of the tube. III. Blowing sounds when air enters a clear tube.

(b) Tympanic Tinnitus, due to: I. Voluntary or involuntary contractions of the tensor tympani muscles, causing crackling of an inelastic drum membrane, also tickling or drumming noises. II. Rales heard on inflating a tympanum containing fluid. III. Blowing sounds heard on inflating a clear tympanum. IV. Succussion sounds due to the movements of thin fluid in the tympanum.

II. Subjective Tinnitus cannot be heard by the observer. It is divided into: A Phonetic Tinnitus, which has, among others, all the causes of objective tinnitus, provided the sound vibrations are too feeble to be heard by the observer; and it is also due to sounds heard because of defects in the sound-conducting apparatus. It is divided into; (1) Exaural Tinnitus, which is divided into (a) Vital Tinnitus, due to normal or abnormal bodily sounds heard because of impairment of the sound-conducting apparatus.

The tinnitus which is due to impaired sound conduction alone arises from the interference with the escape of normal somatic sound from the ear, on account of the resistance offered by the abnormal sound-conducting mechanism. These obstacles chiefly hinder sounds which are normally unheard and have from 16 to 256 vibrations. The tympanum is turned into a resonator for these sounds when the meatus is closed by a rigid drum, foreign body or swelling.

(b) Diplacusis Tinnitus is excited by sound waves and is due to altered character of the sound perception, not of sensory origin. It embraces the following subdivisions, namely: I. Autophonia, when the patient's voice appears to him to be changed in character; probably be to changes

in the sound-conducting mechanism. II. Hyperacusis, when sounds naturally agreeable become unpleasant on account of their piercing or reverberating character, probably due chiefly to defect in the sound-conducting mechanism. III. Diplacusis, excited by other sounds; probably due to defect in either the sound-perceptive or conducting mechanism. A false sound is heard as well as the true sound which excites it. There is lack of auditory accommodation in many of these cases. IV. Paracusis, when the sound is heard altered in character or pitch, or appears to be a wholly different sound. This is probably due to defect in the sound-perceiving apparatus, and perhaps also faulty accommodation. V. After-impression tinnitus, like after-images of the eye, are due to strong stimuli and weak nerves. VI. Tinnitus due to a very loud external sound, explosion, or blow on the ear, lasting after the exciting cause has ceased, but always high-pitched and of a character independent of the exciting sound. It is sometimes permanent. It is probably due to the violence of the blow transmitted to the sound perceiving-apparatus, thus causing more or less permanent injury.

2. End-otic tinnitus is due to weak normal or abnormal sounds originating within the ear and for the most part normally either not heard or unheeded. These sounds, owing to an impaired sound-conducting apparatus, may become annoying. This includes: (a) Circulatory tinnitus, due to increased circulatory sounds within the ear, not loud enough to be objective. I. Arterial dilatation of the vessels of the tympanum may cause blowing sounds synchronous with the pulse. An anomalous artery has been noted in the tympanum. II. Vibrations in the small blood vessels of the tympanum and inner ear may cause a high pitched vibration or a high pitched tinnitus if the sound is reflected on to the nerve endings.

(b) Myotilitic tinnitus is due to contraction of the tensor tympani and stapedius muscles, and vibrations of the muscles, myophonia, usually intermittent. The tensor tympani muscle causes a low pitched tinnitus which may come and go with rapidity. The hearing is slightly affected by the contraction and it appears to the patient as if the slight loss

of hearing was due to the tinnitus. The stapedius muscle causes a very clear high pitched and at the same time a sensation as if an impenetrable veil covered the ear. It often comes quickly and gradually fades out.

(c) Movement tinnitus is due to muscular and other movements, regular, irregular or spasmodic. This form of tinnitus can sometimes be caused by voluntary contraction of the auditory muscles, either as a group or singly. It includes: I. Crackling in the drum membrane, and rubbing sounds. II. Sticky, mucous and snapping sounds due to opening of the Eustachian tube, especially when the secretion is abnormally thick. III. Disturbance of the labyrinth caused by movements of the stapes, producing high pitch tinnitus. IV. Movements of the ossicles, causing tinnitus by their friction. Succussion sounds caused by movements of fluid in the tympanic cavity. V. Vibration of the column of air in the meatus due to wind blowing across it. VI. Sounds in the external meatus, due to the movement of foreign bodies, animate or inanimate.

(d) Somatic tinnitus is caused by the somatic sounds of the ear in cases of impaired sound-conducting apparatus.

B. Neurotic tinnitus has its origin in nervous stimuli not directly dependent on demonstrable sound vibration, and is divided into 1. peripheral tinnitus, which is caused by a series of changes originating outside the ear and comprises (a) reflex tinnitus, which is due to stimulation of the sensory nerves. I. Trigeminal irritation is the most frequent cause of this form of tinnitus, and is produced in several ways. (a) External auditory canal irritation is the commonest of them. (b) Irritation of the nasal mucous membrane. (c) Irritation of the pharyngeal mucous membrane. (d) Toothache, especially of the posterior molars. (e) Irritation of the gums. (f) Neuralgia and hemicrania sometimes have associated tinnitus. The reflex cause of the tinnitus is especially clear if the tinnitus occurs during the neuralgic attack and ends with it. (g) Nasal polypi. (h) Irritation of the bridge of the nose from eyeglasses, has been known to cause tinnitus. (i) The contraction of the muscles of the face may cause tinnitus, probably through reflex contraction of the tympanic muscles. This form of tinnitus is well illus-

trated by involuntary contraction of the orbicular palpebrarum associated with drumming in the ears, which is stimulated by a bright flash of light, a sudden movement or a blow on the head received or anticipated. A converse reflex is seen in the spasmodic contraction of the orbicularis palpebrarum following a sudden loud sound. Irritation of the facial nerve may cause ticking on the ear. (j) Tinnitus with blethero-spasm. (k) Cramp in the orbicularis and stapedius muscles. (l) Closing the eyes firmly may cause contraction of the tensor tympani muscles. (m) Pressure on the tragus may cause tinnitus. (n) Shaking the head sometimes causes tinnitus. II. Digestive tract irritation chiefly due to (a) intestinal worms, and (b) irritation of the stomach in hunger and dyspepsia. III. Sciatic nerve irritation. IV. General cutaneous irritation, as cold feet, etc.

It is probable that these causes act more through reflex vasomotor changes affecting the whole auditory apparatus, especially the muscles, than by reflex stimulation of the auditory nerve fibres. The vasomotors can cause vibrations and a sensation of sound by changes in the volume and tension of the blood in the sound conducting and perceiving apparatus, thus giving rise to circulatory tinnitus. They may also cause stimulation of the auditory nerve fibres by pressure, direct or through the labyrinthine fluid, or again, they can interfere with the action of the normal sound-conducting apparatus by causing congestion and thus giving rise to tinnitus. Direct irritation of any of the structures of the ear may cause reflex tinnitus.

2. Otic tinnitus is divided into (a) conduction tinnitus, due to disturbances of the sound conducting mechanism from very various causes. This is the most common group of tinnitus. It does not include tinnitus originating from demonstrable sound vibration, whether due to impaired sound conduction or not. It is subdivided into: I. Myringal tinnitus, due to affections of the membrana tympani. 1. Myringitis: congestion, edema, serious inflammation, hemorrhagic inflammation. 2. Sclerosis. 3. Perforation. 4. Cicatrization. 5. Adhesions. 6. Relaxations. 7. Atrophy. 8. Calcification. 9. Inward displacement, due to unbalanced atmospheric pressure, muscular action or foreign body.

10. Outward displacement, due to expiratory pressure, to pressure of exudation, or exhaustion of the air in the external canal. II. Tubal tinnitus is due to affections of the Eustachian tube. The most common cause of this form of tinnitus is obstruction, usually at the pharyngeal end of the tube, causing intratympanic vacuum, because the mucous lining gradually absorbs the enclosed air, thus causing an inward displacement of the membrana tympani. It also causes increased intratympanic manometric pressure and outward displacement of the membrana tympani, which may be due to blowing the nose too hard or to congestion of the tympanum, the swelling of the mucous membrane compressing the confined air, or pressure from or retention of tympanic exudate.

1. Congestion, active or passive. 2. Edema. 3. Inflammation. 4. Exudation: serum, mucus pus or blood. 5. Foreign bodies: sea water, etc. 6. Hypertrophies. 7. Organic cicatrices, rare. In the order of frequency they are found first in tympanic, next in pharyngeal end of the tube, least often at the isthmus tubae. 8. New growths. 9. Atrophy, hyperpneumatic tube causing a bowing tinnitus with each respiration. III. Ossicular tinnitus is due to affections of the ossicles and ligaments. 1. Rigidity of the articulations. 2. Ankylosis. 3. Relation of the articulations. 4. Adhesions among the ossicles and to the intratympanic structure. 5. Caries. IV. Mucous tinnitus is due to affections of the tympanic mucous membrane. 1. Congestion. 2. Edema. 3. Inflammation (Catarrhal, serous, purulent, hemorrhagic). 4. Polypi. 5. Sclerosis. 6. Atrophy. 7. Hemorrhage. V. Contraction tinnitus is due to defective action of the tympanic muscles. 1. Spasmodic contractions. 2. Contractures and shortenings. 3. Paralysis.

These are the chief causes of impaired sound accommodation and the presence of diplacusis tinnitus.

VI. Adhesion tinnitus is due to intratympanic adhesions. 1. Organization of exudate. 2. Cicatrization. VII. Fenestral tinnitus is due to affections and disturbances of the fenestra. 1. Impaired motion of the stapes. Impacted stapes, causing a singing, usually a high pitched tinnitus,

and impaired motion of the membrana rotunda. 2. Clogging of the fenestrae by products of inflammation, etc.

This group includes the chief causes of impaired overflow of the somatic sounds from within the labyrinth and the resultant high pitched singing, "sizzling" tinnitus.

VIII. Traumatic tinnitus is due to: 1. Foreign bodies, liquids or solids. 2. Wounds of the tympanic contents, incised or contused. IX. Tension tinnitus, due to tension anomalies, includes all the above causes of obstruction to sound conduction and many others of a more delicate character; in fact, everything that in any way affects the acoustic balance.

These cause tinnitus chiefly probably by the interference they make in the dampening function of the ossicular chain, and by irritation of the sound perceiving apparatus owing to interference with the acoustic balance. This includes the most difficult cases of conduction tinnitus.

Common causes of this loss of balance are: (1) Anomalies in the tension of the mucous lining of the cavum tympanum, especially the reduplication of mucous membrane described by me elsewhere. These act in three ways: (a) By their weight alone, which is increased by congestion. (b) By their want of elasticity, checking the motion of the ossicular chain. (c) By their contraction, holding the chain in an abnormal position. (2) Abnormal tension of the drum membrane. (3) Abnormal tension of the ossicular ligament. (4) Incoordinate muscular action interfering with accommodation. X. Meatal tinnitus due to disturbances in the external meatus, caused by (1) Inflammations. (2) Accumulated secretion and exudate, or anything causing pressure on the drum membrane, such as foreign bodies in the meatus. A small hair on the drum is sufficient to make loud tinnitus by interfering with the acoustic balance or by reflex muscular movements due to its presence. It also gives rise to friction sounds on the drum membrane. (3) Exhaustion of air and negative pressure in the meatus, due to its hermetical closure by cicatrices, inflammation, tumors, cerumen, and foreign bodies; and the resulting outward displacement of the drum membrane which may cause very distressing tinnitus and other symptoms more severe

than in inward displacement of the membrane. (4) New growths of hypertrophies.

How the foregoing causes give rise to tinnitus is not clearly proven. They probably do so in some of the following ways: (1) By circulatory changes. (2) By direct stimulation of the sound perceiving apparatus through the labyrinthine fluid, brought about by the reflection of the high notes of the vibrations in the skull, or somatic sounds which normally escape through the fenestrae. This is not effective for sounds much above c^4 . (3) By reflex irritation and movements of the tympanic muscles.

(b) Reaction tinnitus is due to irritation within the tympanic cavity from any cause not sound vibrations directly stimulating the auditory muscles, vessels, or nerve. The commonest of these causes are:

I. The presence of fluid where normally only air is found. II. Compression of the mucous membrane due to congestion and swelling. III. Irritation of the nerves, due to inflammation. IV. Foreign bodies and new growths.

(c) Sensory tinnitus is due to disturbances of the sound-perceiving apparatus: labyrinth, auditory nerve, and its roots, caused by nerve stimulation independent of sound vibration. This stimulation may be produced by

I. Drugs: Quinine, salicylates, iron, alcohol, tobacco. II. Pressure: Inflammation, tumors and new growths, fractures or contusions, hemorrhages, calcifications, varicosities, colloid degeneration of the auditory nerve. III. Changes in the blood supply: Composition of the blood (toxins) and tension of the blood, trophic changes.

It has been suggested that the sound-perceiving apparatus reacts to stimuli and irritants of various kinds by giving a sensation of high pitched tinnitus c^4 or c^5 .

(d) Central tinnitus is a purely nervous affection and occurs without impaired hearing, and has no reflex origin. When it accompanies sensations of light and disturbances of other nerves it suggests cerebral disease. It is found in nervous, excited individuals, in over-stimulated mental states, after trouble, in exhaustion, in anemia, after parturition, after loud sounds, occasionally in apparently normal individuals.

The causes of otic tinnitus are identical with the causes of deafness.

SUMMARY OF CLASSIFICATION.

Tinnitus:

I. Objective.

(A) Vibratory.

1. External:

- (a) Vascular.
- (b) Pharyngeal.
- (c) Respiratory.
- (d) Muscular.

2. Internal:

- (a) Tubal.
- (b) Tympanic.

II. Subjective.

(A) Phonetic.

1. Exaural:

- (a) Vital.
- (b) Diaplacsis.

2. Endotic:

- (a) Circulatory.
- (b) Myotilitic.
- (c) Movement.
- (d) Somatic.

(B) Neurotic.

1. Peripheral:

- (a) Reflex.

2. Otic.

(a) Conduction:

- I. Myringal.
- II. Tubal.
- III. Ossicular.
- IV. Mucous.
- V. Contraction.
- VI. Adhesion.
- VII. Fenestral.
- VIII. Traumatic.
- IX. Tension.
- X. Meatal.

- (b) Reaction.
- (c) Sensory.
- (d) Central.

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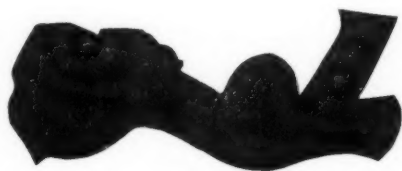
XVI.

ANEURISM OF THYROID ARTERY.

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Man, aged 62, height about 5 feet 5 inches, weight very little over 100 pounds, estimated. Called to see him about 2:30 one morning because of difficult breathing. His symptoms seemed to point to asthma, but after close examination the diagnosis was left in doubt. While inquiring into his history I was informed that he had already had twenty-



three doctors since the symptoms first manifested themselves several years ago. The patient was always cheerful during the attacks. He had not the asthmatic hoarseness nor [the peculiar characteristic rales so pronounced in asthma. Nearly all of his previous physicians pronounced the condition one of asthma, as did also the gentlemen I met in consultation. I did not agree with this opinion, but could not explain what caused the symptoms. Close inquiry did not elicit any facts which might lead on to causation. Drugs seemed of no particular use since so many had been tried and had failed so I treated the patient topically when he came to the office, not expecting any result. The throat and

larynx and part of the trachea could easily be examined but nothing unusual detected. This condition kept on for several months, when his symptoms became markedly worse. Being satisfied that spasmodic asthma was not the cause of the distressed breathing, I proposed tracheotomy as possibly affording some relief. To this the patient consented and the trachea was opened under cocain anesthesia. This procedure gave him considerable relief, but he gradually grew weaker and died three days later. At the post-mortem we found some thickening in bronchial tubes due to chronic bronchitis. A large mass of clotted blood the size of a man's hand and which looked like liver, was found along the trachea, also a tumor one and a half inches in diameter, apparently attached to the trachea and ready to penetrate by erosion. It had already destroyed the soft tissues between the tracheal rings. This was examined microscopically by Dr. Bentz of the Laboratory at the University of Buffalo and found to be clotted blood. The tumor, situated within the tracheal wall by pressure upon the pneumo-gastric, caused the difficult breathing, simulating spasmodic asthma. The relief after tracheotomy was no doubt due to the bursting of the tumor thereby relieving pressure on the pneumo-gastric.

Post-mortem diagnosis: Aneurism of thyroid artery.

XVII.

SPONTANEOUS DISCHARGE OF CEREBRO-SPINAL FLUID.

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In September, 1899, I removed a ridge from a septum in a young man aged 25. There was more or less hemorrhage for over a week. One evening, while trying to expel some clotted blood, he noticed a slight pain in the left ear, which seemed to him like pressure on the drum head. During the night the pain became very severe, but, after applying heat, a profuse watery discharge suddenly took place, causing immediate cessation of pain. This fluid came away in large quantities and remained clear for several days, when it took on a cloudy appearance. The discharge saturated the cotton which filled the meatus, in fifteen minutes, day or night, and had to be removed constantly. After a week the quantity diminished somewhat, ceasing entirely on the 18th day. Twenty-four hours later it began again and continued until the 27th day, when it ceased entirely and gave no further trouble. The hearing, which was impaired during the discharge, gradually recovered, though it did not become as acute as on the right side. However, it is better than it was before the operation on the nose. He had had a buzzing sound in the left ear for years; this was entirely relieved when the discharge ceased, but has been noticed since then at rare intervals. It was, of course, impossible to estimate the quantity of fluid which escaped, but the patient claims it must have been at least $\frac{1}{4}$ pint (probably very much more). The patient is very intelligent and I know he does not overstate the fact. In my opinion, the cause of the discharge was great pressure on the brain fluid in forcibly blowing the nose, brought to bear over the middle ear, the roof of which remained unossified—not so common an occurrence along the tract of the petro-squamosal fissure. This pressure forced the cerebro-spinal fluid through the fissure, the pain continuing until the drum head ruptured and allowed the fluid to pass through the external meatus. I believe this to be one of those cases of spontaneous discharge of brain fluid about which otologic literature is so conspicuously silent.

XVII.

A CASE OF LABYRINTHINE DISEASE, WITH REMARKS.*

BY JOHN K. STERRETT, M. D.

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The case about to be related is of interest more on account of the persistent absence of grave symptoms than to anything unusual in regard to treatment or result.

As far as I can learn the chief symptom of carious or traumatic inflammation of the labyrinth is vertigo, with or without simultaneous nystagmus. (Lucae)

Case.—Miss A.—Family history excellent. Age 19 years, her general health is, and has been always of the very best although she had a slight attack of scarlatina when six years of age.

Patient states positively that she did not have any otitis media until three years after her attack of scarlatina so that her present ear inflammation is of 10 years standing. The discharge during that time was periodic, intervals of one and two years sometimes intervening. Her first attack was mild, as she had little or no pain. Her general health during that period was very good.

Two years ago the patient commenced her last attack of purulent discharge from the right ear, it being the one diseased. Six months after I removed the ossicles or rather their remains as the malleus was fully half necrosed.

At this time which is now about 18 months ago the ear upon examination presented the ordinary appearance of a long standing purulent middle ear inflammation with about half the membrana tympana absent. The patient had no pain, dizziness or tinnitus nor had she experienced any of these symptoms, and her reason for having any operation

*Read before the middle section of the American Laryngological, Rhinological and Otological Society, Pittsburgh, Feb. 22, 1904.

done was on account of the annoyance of the rather slight, though foul smelling discharge from the ear.

The operation did not seem to affect the discharge much although I think it was done as thoroughly as the average, a general anesthetic being given. The foot plate of the stapes was not disturbed but the walls of the middle ear were carefully curretted. No dizziness or tinnitus followed the operation. Until October of last year the patient made occasional visits to my office, and I removed at those times a number of polypi, but could never detect any necrosed bone in the ear. While out of the city Miss A. was seized with a throbbing pain in her ear, during the last of October, 1903. This pain lasted three days and nights and the physician whom she consulted told her after examining the ear that she had taken cold.

Two months later upon her return to the city she came to my office, and I removed a complete bony mold of one of the semicircular canals which I found lying upon the floor of what was the middle ear. Since that time the patient has had no more polypi, and the discharge has ceased.

During all this time the hearing distance for the diseased ear has remained about the same, ordinary conversation being heard at three feet distance. The patient states she hears better when everything is absolutely quiet. Bone conduction while diminished is remarkably good for the forks.

As to the remarks upon this case, while I do not feel able to express a very pronounced opinion, it seems to me that this case should make us more careful in regard to our prognosis and treatment of cases of chronic suppurative otitis media, as I have always been led to believe that we find a train of symptoms such as vertigo, nausea and vomiting, unconsciousness and profound deafness in all or nearly all cases where the internal ear is so much affected as the case just reported.

I wish again to emphasize the fact that this case has had absolutely no vertigo or nausea unless pressure is made over the region of the canals when dizziness is very marked while the pressure continues.

I have in mind three other cases of necrosis of the internal ear alone, one of which was trephined for a cerebellar tumor,

one operated upon for an abscess of the middle fossa, and the third for mastoiditis with lateral sinus complication. I could relate several other cases which have come under my own observation, in which the diagnosis was at first very doubtful although appearing plain, but I hope these few will have helped make my point so plain that when we have a chronic suppurative otitis media of long standing we will take into consideration the extension of the disease into the internal ear even if internal ear symptoms are absent, before looking for trouble within the skull cavity.

XIX

LITHEMIC NASO-PHARYNGITIS DUE TO SYSTEMIC DISTURBANCE.*

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LEXINGTON, KY.

In the treatment of all diseases, the facts as to the cause of the existing condition is what concerns us most. What is the matter, and why does it exist, and what will relieve and palliate the condition, are the perplexing questions that we must face.

By the term lithemic naso-pharyngitis is meant that type of disease having a close etiologic relationship to rheumatism, or the so called lithemic diathesis, and having its origin or auto-intoxication caused by the absorption of byproducts from the intestinal tract, or in faulty metabolism occurring in the liver. It may be defined as an acute congestion rather than an inflammatory process.

The local manifestations of this so called diathesis may not be confined to the pharynx but may exhibit itself in affections of the larynx, nasal, auditory, and gastro-intestinal tract without any special organic or systemic symptoms.

The attack causes primarily no lesion, and there is no distinct pathologic alteration, this being a local manifestation of a systemic condition. These cases are neurotic, sedentary, good livers, a snorting, snuffling handkerchief using set, who blame all their ills upon a catarrh.

Little water is drunk, meats and sweets are freely used, the skin is florid or muddy, and constipation exists. A case with such a history leads me to suspect at once indicanuria with probably an excess of uric acid. My observation is that where there is an abundance of indican in the urine in

*Abstract of paper read before the Middle Section of the American Rhinological, Laryngological and Otological Society, Pittsburgh, Pa., Feb. 22, 1904.

cases such as I have described, there is no permanent relief until it is eliminated. It is not so much a question of diet as regulating the intestinal tract.

In aggravated cases I always have the gastric contents analyzed after giving a test meal. For if the contents of the stomach enter the duodenum in a hyperacid condition, intestinal digestion is inhibited, and putrefactive fermentation of the mass results.

Treatment. The chief question to bear in mind is not what drugs to use, but how best to remove the cause, how best to eliminate. Citric, mallic, and the fruit acids should not be used. Where acid drinks are craved, they may be given at meals, with the free use of non-medicated water between meals. Local applications, gargles, etc., are contradicted, although thorough cleansing of the pharynx, tonsils post-nasal spaces, etc., affords marked relief.

The cause of the trouble being within the body, treatment must be directed toward removing the cause, and the first indication is to clean out the alimentary canal. The diet should be restricted, and about six ounces of water be given hourly.

An hour before the evening meal, the colon is flushed with two or three quarts of soap suds, by means of the colon tube and at bed time, eight ounces of warmed olive oil injected through the colon tube, the patient being warned to keep quiet and go to sleep.

As a rule the treatment should be given for four or five days, and then once or twice a week. In a majority of cases observed, the relief has been pronounced, even chronic, intractable cases being given complete relief, not only of the naso-pharyngeal trouble, but of other systemic affections.

The facts of one or more evacuations daily, does not prove that toxic fecal matter is not still retained. Hardened masses may be removed after ten days of treatment.

It is interesting to note the rapid decrease of indican in the urine as shown by the daily tests.

Where there is an excess of uric acid in addition to indican, drugs that will hyperalkalinize the blood, and increase its solvency for urates, are indicated. Mild cases do not need the treatment detailed, but are relieved by alkaline cathartics.

XX

THE TREATMENT OF EAR DISEASES AND OF AURAL VERTIGO IN PARTICULAR WITH LUMBAR PUNCTURE.*

BY J. BABINSKI.

PHYSICIAN TO THE HOSPITAL DE LA PITIE.

TRANSLATED BY HANAU W. LOEB, A.M., M.D.

We can hardly conceive, at first glance, that lumbar puncture would be capable of exercising an influence upon auricular troubles, and might herefore be tempted *a priori* to reject this method of treatment. It will, on this account not be without interest, I think, to make known the reason which led me to undertake it.

In order to elucidate the sequence of my ideas I should call to mind, at first, certain physiologic facts. When the electrodes of a voltaic apparatus are applied to the temples or to the mastoid processes, one on each side and when an electric current of some milliamperes is passed, there is provoked, among other phenomena, in the normal state a sensation of vertigo, of nausea, nystagmus and a lateral inclination of the head to the positive pole. Moreover, I have shown that by placing the electrodes in a particular position† a rotation of the head takes place toward the positive pole. The combination of these disturbances has been called "Voltaic Vertigo." What is its mechanism? Until lately physiologists have disagreed on this matter. Some, really the greater number, consider that voltaic vertigo is a reflex perturbation occasioned by electric excitation of the vestibular

*From the *Annales des Mal. de l'Oreille, du Larynx, du Nez et du Pharynx*, February, 1904.

†Sur les mouvements d'inclination et de rotation de la tete dans le vertige voltaïque. (*Soc. de biologie*, April 25, 1903.)

part of the labyrinth. Others believe that it depends upon the direct irritation of the nerve centers produced by the passage of the current through the brain. In order to settle the question at issue, I made several years ago, some observations which convince me that affections of the ear modify the voltaic vertigo.* I saw, as already noted by Ewald and Pollak, that in bilateral lesions the resistance to voltaic vertigo was often increased that is to say that the production of this vertigo required a current of greater intensity than the normal state and that in certain cases the vertigo was absent even when a very strong current was used. Furthermore, I observed this novel fact that in unilateral lesions the inclination predominated ordinarily toward the diseased side or operated only on that side whatever the direction of the current, and that the rotation was always limited to one side. Having recognized in the course of my observations that in hysterical deafness the voltaic vertigo is unchanged, I believed it possible to deduce from my observations that the modifications above indicated constituted important signs from the standpoint of the differential diagnosis between hysterical and labyrinthine deafness, which otherwise could not be distinguished by any objective characteristics† At the same time I established that voltaic vertigo is due to an excitation of the labyrinth.

On the other hand methodical examination, practice before and after puncture upon patients with no other affection besides the ear disease who submitted to lumbar puncture for therapeutic or diagnostic purposes made it possible for me to determine that the withdrawal of a certain quantity of the cephalorachidian fluid diminishes as a rule the resistance to voltaic vertigo.

The following syllogism results from this series of observations: 1. Voltaic vertigo has its origin in the excitation of the labyrinth; 2. Lumbar puncture acts upon voltaic vertigo; 3. Therefore lumbar puncture acts upon the labyrinth.

This action is not unexplainable when we consider that

*De l'influence des lésions de l'appareil auditif sur le vertige voltaïque. (Soc. de biologie, Jan 26, 1901.)

†Sur la valeur semeiologique des perturbations dans le vertige voltaïque. (Soc. de neurologie, May 15, 1902.)

pressure of the labyrinthine fluid may be subordinate in part to that of the cerebrospinal fluid.

It is therefore quite natural to ask whether or not lumbar puncture may exercise a favorable influence upon labyrinthine troubles and it is also quite natural that it should be used as a therapeutic experiment. According to the best authorities the classic methods of treating the diseases in question are generally not efficacious or but slightly so; on the other hand lumbar puncture is not a dangerous operation which so far as I know has never caused tinnitus, vertigo or deafness and therefore we may consider it harmless in the diseases which we propose to treat. Nevertheless, for greater security, I proceeded with great prudence in removing at the beginning a small quantity of fluid and in putting the patient at complete rest following the operation. I grew bolder little by little when I became convinced that the operation was an innocent one.

I have little to say of the operative technique. I operate in the usual way. I may mention that all the patients were kept in the sitting position during the operation. At the beginning I removed only 4 to 5 cc. of fluid; now I remove from 15 to 20. I recommend that the patients abstain from anything that might cause fatigue for several days following the operation and that they lie down with the head in a horizontal position if any nausea or headache be present.

In the majority of cases a single puncture was made but in several it was performed with advantage two or three times at intervals.

The results which are reported relate exclusively to those collected in my service at the Pitié. All the patients have been examined and followed up from a local point of view by my friend, Dr. G. A. Weill, otologist, whom I must thank for his invaluable collaboration* in 106 cases.

I have already said that lumbar puncture is an inoffensive operation. Patients having ear affections, as others, suffer from pain in the head and nausea for a period seldom exceed-

*I must express my obligation for the assistance of a young aurist, Lumineau, who has aided me in my work. Most of the detailed observations of our patients will be found in his inaugural thesis.

ing a week; they may even complain at the beginning and exceptionally at other times that their ear troubles have been increased but these phenomena are only transitory. I may even state that they are rarer in those suffering from aural disease than in those whose ears are normal, that in many they are entirely absent and that the absence of any appreciable reaction after puncture coincides usually with an absence of all therapeutic action.

I assert that lumbar puncture should never be followed by any general accident nor should it ever aggravate the local state. In performing it therefore there is no infringement of the fundamental medical precept *primo non nocere*.

We have seen that where there is no ear affection present, rachicentesis diminishes the resistance to voltaic vertigo—likewise in other affections. Some do not present these characters, doubtless those in which the vestibular part of the labyrinth is greatly affected. In these, the resistance is not modified after lumbar puncture. On the other hand I have often seen, in patients suffering from ear disease, voltaic vertigo become normal after the operation whereas it had been entirely unilateral from the standpoint of inclination or rotation.

I now come to the essential part of my subject, that which relates to the useful effects of lumbar puncture.

The majority of patients do not observe any amelioration of their condition immediately after the puncture. Some however, generally those suffering from vertigo, state immediately that they are more at ease and that their head is freer. There are also those who hear better. Ordinarily on the next day or the day following, the favorable affects appear, and the vertigo, tinnitus and deafness diminish in spite of pain in the head and nausea caused by the puncture.

But we must not be in haste in such cases to claim a victory. It is not uncommon for tinnitus and deafness after being diminished for some days to reappear at the time when the effects of the operation disappear. We can understand that these cases may be easily explained upon the ground that the cerebro-spinal fluid is rapidly reproduced. It is singular that the results may persist long after the rachicentesis although the fluid has probably reaccumulated;

that they may be even accentuated; this can not be doubted as we shall see. I pass in successive review the three essential subjective ear troubles, vertigo, tinnitus and deafness, making thus a symptomatic classification and I will show the effect of the lumbar puncture upon each of these symptoms.

Of these three manifestations, vertigo surely is the one most frequently and markedly influenced by rachicentesis. 32 of the 106 cases observed were affected with vertigo, paroxysmal in some and continuous in others. In some cases the vertigo was accompanied with violent tinnitus and nausea presenting the classic symptom-complex of *Ménière*, in other cases it consisted only of a sensation of instability appearing after certain movements and manifesting itself in staggering. But I intend to show in view of the confusion of terms that the word vertigo is employed in its exact sense and although the vertigo was more or less intense, continuous or intermittent, in the various patients, it was in all very characteristic. Of the 32 cases, lumbar puncture was performed in eleven without success. A very satisfactory result was obtained in the other 21 cases, at times altogether remarkable. Seven of the cases relieved of the vertigo remained well for six months at least and one for 13 months. In order to give an exact idea of the effect of the rachicentesis, I think it best to present the various observations in resumé:

OBSERVATIONS.

CASE 1.—57 years of age; pure affection of the labyrinth; auricular troubles for 8 or 9 months; tinnitus and whistling sounds continually on the left side; decided diminution of hearing on the same side; vertigo upon the slightest movement; mental depression. A single puncture was followed after ten days by a disappearance of the mental condition, vertigo, whistling sounds and by considerable diminution of the tinnitus and deafness. This result has continued for thirteen months.

CASE II.—37 years of age; adhesive otitis consecutive to acute otitis media on the right side; evident petro-mas-

toid trouble for six years; during this time deafness almost complete and tinnitus; for three weeks increase of tinnitus and vertigo; some days after rachicentesis, the tinnitus and vertigo disappeared, the deafness decreased and is still decreasing. This result has continued for nine months.

CASE III.—39 years of age; adhesive otitis consecutive to acute suppurative inflammation of the left ear for six years; during this period deafness complete on left side tinnitus, attacks of vertigo with neausea and falling; for five months considerable accentuation of the vertigo, tinnitus and confusion of intellect; several days after the rachicentesis an amelioration manifested itself and progressively increased; at the end of a month considerable diminution of deafness, disappearance of tinnitus, of vertigo and mental trouble; later following a slight operation upon the middle ear by an aurist of the city, the tinnitus reappeared; but the result with reference to audition and vertigo has continued for nine months.

CASE IV.—63 years of age; pure affection of the labyrinth consecutive to a fall from a horse five years before; for four years attacks of vertigo with tinnitus, nausea and staggering; for two years vertiginous state constant, attacks repeated 5 or 6 times a day; tinnitus continuous, diminution of hearing; lumbar puncture followed by an immediate amelioration and ten days later, vertigo, tinnitus and deafness disappeared; this result has been maintained for seven months.

CASE V.—53 years of age; pure affection of the labyrinth; for one year, continual vertigo, increased by sudden movements; continual tinnitus greatly aggravated during the vertigo; rapid improvement after puncture; eight days later disappearance of tinnitus and vertigo; the result has continued for seven months.

CASE VI.—36 years of age; progressive sclerosis of both ears; feebleness of hearing; for three years continual tinnitus and vertigo; after puncture, disappearance of vertigo which has not reappeared for six months.

CASE VII.—35 years of age; progressive bilateral sclerosis; great diminution of hearing; for one year continual tinnitus and attacks of vertigo; after puncture, tinnitus decreased

and vertigo disappeared; this result has continued for six months.

In the second group I place four cases relieved from vertigo with which they were attacked and in whom the cure continued for three months; one suffering from a pure labyrinthine lesion increasing for twenty years had for 18 months continual vertigo; the second also suffering from a pure labyrinthine lesion had had vertigo for one week only; the third suffering from adhesive otitis, for several years, had vertigo which was at first intermittent and later became continuous; the fourth suffering from dry otitis had attacks of vertigo with tinnitus and nausea several times a day.

A third group consists of seven cases which disappeared and whose actual state we do not know. We can only say that during the period in which they were under observation varying from 15 to 40 days, the relief continued; one of these cases had a pure labyrinthine lesion, two a adhesive otitis and the fourth a dry otitis.

Finally, in the fourth group, I include three cases, of whom one suffering from dry otitis with vertigo, has been free from vertigo for five months which however had a tendency to reappear. A second with adhesive otitis has had a sensible amelioration which however has decreased. The third, with dry otitis has only shown a slight but perceptible improvement which has lasted for five months.

If we may judge by these statistics, we may say that in the treatment of vertigo by rachicentesis, success is the rule and failure the exception. I know of course that it may be claimed that I have had a series of very favorable cases, that lack of success or partial success is perhaps more common than my statistics tend to establish and furthermore that my patients particularly those in whom the vertigo disappeared have been under observation only a few weeks and can not be considered as definite cures. Nevertheless the results obtained, whatever the future may be, are important especially if it is remembered that other methods employed in like cases are of little value or absolutely useless.

The symptom, tinnitus, is certainly much more rebellious to treatment than vertigo. In ninety cases, there were thirty

in whom the trouble diminished appreciably or disappeared and among these there were ten in whom the results continued for three months or less; some even remained cured for a longer time, seven months, ten months, thirteen months. It is true that among the twenty others there are certain patients who were not under observation more than one month. However this result is still satisfactory compared to that obtained by the usual methods of inflation, bougieing which, in contrast with rachicentesis, may increase the tinnitus.

Finally deafness is perhaps still more rebellious to rachicentesis than tinnitus. If I deduct the cases in which an improvement of one or more weeks was followed by a return of the previous state and those in which in spite of the statements of the patients, perhaps too optimistic, the result did not seem to me altogether incontestible, only 13 out of 100 cases of deafness remain in whom I was able to obtain an improvement, but these were manifest. It was recognized by the patients, their families, my collaborators and myself, thanks to comparison of examinations made before and after puncture. The following are some brilliant examples of success:

A woman with an attack of complete deafness of one ear for six years following a suppuration, recovered her hearing shortly after puncture so that she heard whispering at two metres. This result has continued for nine months. A man who had an otosclerosis, being completely deaf for 20 years was decidedly improved after puncture; to his great astonishment, he heard noises which he could not hear before and he can hear what is said to him by one speaking in a loud voice close to him.

Finally a man aged 35 years, a deafmute since he was two and a half years old, absolutely deaf in one ear and almost absolutely deaf in the other, having tried every imaginable treatment without success submitted to three successive punctures, the first without result, the second followed by a slight amelioration, which was increased by the third. Today he hears loud voice spoken at 20 centimetres distant on the side which seemed to be absolutely nil as to hearing. At the same time there has been a modification of his voice

which presented the characteristics of that of a deafmute.

This observation is further interesting because it shows we should not give up hope when a single puncture is without effect. If all the patients whom I have classed as unsuccessful had been subjected to puncture several times, my statistics would perhaps show fewer failures.

I should remark that deafness has been improved especially in those patients who had vertigo and tinnitus at the same time; monosymptomatic deafness is particularly refractory. I would add that although, in the hierarchy which we have established, vertigo occupies the first place, tinnitus the second and deafness the third, we observe exceptionally in some cases diminution of deafness more pronounced than that of the tinnitus or even of the vertigo.

If now I make a classification of cases founded not upon the character of the subjective symptoms but upon the nature and seat of the lesions, I count eight pure affections of the labyrinth, twenty-two of adhesive otitis and seventy-six of dry otitis. From this standpoint I find that pure affections of the labyrinth are best acted upon by puncture; of the eight cases comprising this group, six were greatly improved or cured. I should observe, however, that in none of these cases was it a question of complete deafness as the deafness was in a majority of these cases but slightly pronounced and the dominant symptoms were those of irritation of the labyrinth characterized by vertigo and tinnitus.

Rachicentesis appears to have more action on auricular troubles when they are associated with a adhesive otitis than when they are dependent on a dry otitis. The difference seems more appreciable if we consider the symptom tinnitus which in twenty-two cases of adhesive otitis was happily modified ten times.

I think that I am authorized by the analysis of my cases to draw the following conclusions: Rachicentesis exercises a remarkable influence upon auricular vertigo; ordinarily it is lessened or disappears. It may act favorably upon other auricular troubles such as tinnitus and deafness but in these its action is less extensive. Rachicentesis is generally more efficacious in pure labyrinthine lesions than in mixed lesions

of the ear and usually more efficient in adhesive otitis than in dry otitis.

A rachicentesis is not dangerous and does not expose those who submit to it to any aggravation, it may be used except under special contradictions upon all those affected with ear disease which has been refractory to the various methods of local treatment.

XXI.

ON A CASE OF APHTHOUS LARYNGITIS.*

E. J. MOURE. M.D.

BORDEAUX, FRANCE.

TRANSLATED BY CHEVALIER JACKSON, M.D.

The occurrence of aphthous ulcerations in the mouth, and even in the pharynx, is so well known to all practitioners that it would be useless to describe this lesion. Suffice it to say that it is characterized by the presence of little erosions generally cupule-shaped and oval, occupying the internal surface of the cheeks, the lips and the edges of the tongue.

The eruption is usually quite discrete and occurs in crops which are quite ephemeral lasting 24 to 48 hours. In some patients successive crops of aphthous erosions may be observed, being produced by any food that is even slightly spiced or irritating, and especially by fish, shell fish, high game and preserves.

On the other hand, aphthous erosions of the laryngeal mucous membrane are much less known and seem to be very much rarer, on this account I believe it my duty to report the following observations:

M le. X., 23 or 24 years of age, consulted me at the "Clinique Laryngologique de la Faculte," in the latter part of December, complaining of intense dysphagia, being able to swallow saliva and liquids only with great difficulty. Wines and bouillon especially smarted intensely as they passed down. This painful state had lasted 48 hours, in spite of various gargles prescribed by the attending physician. There were no fever or other constitutional symptoms. There were no lesion discoverable externally; no adenopathy; no tenderness on pressure externally on the neck; and the examination of the mouth and pharynx was negative. But, on laryngoscopy,

*Communication to the meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society of Pittsburgh, Pa., Feb. 22, 1904.

I discovered on the base of the tongue, at the site of the lingual tonsil, and on the free border of the epiglottis, several cupule-shaped small erosions, transversely elongated, covered with a grayish opaline coating and surrounded by a somewhat reddish areola outlined against the surrounding healthy mucosa. I at once suspected the trouble to be an aphthoid condition of the base of the tongue and of the larynx and interrogated her in regard to aphtha in the mouth. I then learned that she had been subject to attacks of aphthous erosions, and that recently she had had them on the internal surface of the lower lip and side of the tongue. She could not attribute the present attack to anything. I had one of the students of the Clinique apply to the affected region a twenty per cent. solution of silver nitrate, prescribed an alkaline gargle and ordered a regimen of milk, eggs and Vichy water, requesting the patient to return. Two days later, when she presented herself again for examination, the local painful symptoms had completely disappeared and swallowing was normal. Laryngoscopic examination revealed a scarcely discernable redness at the site of the erosions, in a word the normal mucosa was restored.

I have not since seen the patient, which leaves me to suppose that she is completely cured of the eruption.

The foregoing sufficiently indicates the symptomatology of the affection without further elucidation, the principal trouble consisting of a very intense dysphagia, severely painful, especially on swallowing either of saliva or of food, particularly wnes and boullion. In some cases I have seen the dysphagia so severe as to interfere with alimentation. I remember one case, a confrere, who came to consult me in great distress and perplexity, because during the preceding 24 hours he had been unable to swallow anything so great was the pain on deglutition. In this case, also, I discovered an aphthous erosion on the tip of the epiglottis which rapidly disappeared under the application of argentic nitrate.

The observations merit reporting, I believe, because a description of such cases is not to be found in the classical books; and on this account I wish to call the attention of my transatlantic confreres to this special point in laryngeal pathology.

XXII.

MANUEL GARCIA.*

FELIX SEMON.

LONDON, MARCH 17, 1904.

On this day the father of Laryngology enters upon his 100th year.

The laryngologists of the whole world join in the hearty wish that our Master may celebrate his hundreth birthday and many more in the same remarkable and physical freshness and strength in which his 99th birthday finds him. *Quod bonum felix, faustumque sit!*

The London Laryngological Society, whose oldest honorary member is Manuel Garcia, has appointed a committee consisting of its present and former presidents, for the proper celebration of his 100th birthday March 17, 1905.

The committee decided upon the following at its first meeting.

To deliver an address to the honored one on the day of the celebration.

To co-operate with other laryngological and musical societies for the double purpose of getting together a testimonial as a perpetual souvenir of this rare jubilee, and of arranging a banquet for the evening of the day of the celebration, where it is hoped that the one honored would be present.

A tentative inquiry of his wife showed that his family wished the souvenir to take the form of his picture, and we believe that this idea will be received with approbation by those who will take part in giving it. A portrait that shows the founder of laryngoscopy in his 100th year will be not only of historical value, but reproduced in engraving or photograph would be an ornament to the assembly rooms of all laryngologic societies, as well as the con-

*From the Intra Centralbl. for Laryngol., Vol. XX, No. 6.

sultation rooms of the laryngologists of every nation.

The committee of the London Laryngological Society will soon communicate with the other laryngological societies of the world, some of which will certainly want to take part as a society, as it is desired that the collection for the testimonial not only be started as soon as possible, but finished, in order to make arrangements with the painter to whom is to be given the preparation of the portrait.

The present communication is only a preliminary one.

PROCEEDINGS OF THE MEETING OF THE MIDDLE
SECTION OF THE AMERICAN LARYNGOLOGIC-
AL, RHINOLOGICAL AND OTOLOGICAL SO-
CIETY, HELD AT PITTSBURGH, PA.,
FEBRUARY 22, 1904.

The Chairman, Dr. Chevalier Jackson, on behalf of the Pittsburg members, in a few happy and well chosen words, welcomed the members to Pittsburg. He called attention to the number and eminence of the members present, and to the program, evidence of the good work that can be done by the sections. He said he preferred not to intrude a long opening address, which would only delay the hearing of better things, better said, by better men.

Cholesteatomatous Disease of the Tonsils.

By Dr. Norval H. Pierce, Chicago, Illinois. See page 36.

DISCUSSION.

Dr. J. A. Stucky, Lexington:—I did not know before that the tonsil had an appendix. I suppose all have seen a number of these cases which are sometimes a source of embarrassment and annoyance to the patient as well as to the physician. I never thought to call it cholesteatoma. I had not associated the word with anything which had an odor such as these cheesy masses in the tonsil, and Dr. Pierce's paper not only strikes me as being unique and interesting, but suggestive and therefore profitable.

The only point that I desire to mention is this: How best to get rid of the cause of these troubles. He mentions slitting the sac, and cutting it out, but that, even in the hands of the most careful operator, is a little risky. Many mention the use of nitrate of silver, which we have all tried, and we have tried chromic acid, and also the galvanocautery, but have given that to the shelf where I think it belongs. I have tried in the last few months the slitting up of the sac

and cleansing the membrane thoroughly and then the daily application for about a week of argyrol, unsaturated solution. It has given me better results than anything else, but I cannot explain the mode of its action. I do not know what causes the odor, but suppose it is the decomposition and putrefaction.

In regard to the hemorrhage, some cases bleed and the Lord only knows why, and he is reticent on that point. I have seen them bleed after operations by the best men in the country, and after a cold wire snare and galvanocautery. I saw one bleed in Cincinnati a few weeks ago, where the work was done as nicely as any I ever saw. A few nights ago a colleague called me up with a hemorrhage from a tonsil which he had removed a few days before. I looked carefully for the cause of the hemorrhage, and did not find the condition of affairs in the fascia that Dr. Pierce speaks of, but the patient bled. I have seen several cases and I never saw better results obtained than from chromic acid, fused on a probe. We have tried the hemostatics, adrenalin chloride, etc.

Dr. C. A. Richardson, Washington:—I would like to say a few words on Dr. Pierce's paper. This paper of Dr. Pierce's is most interesting and reaches something in which we are all interested. This cholesteatomatous formation of the tonsil is one which cannot always be diagnosed before the tonsillar flap is opened. I remember some years ago I had a patient who was about to be married and who was disturbed about the odor of his breath. I could find no reason to account for the odor. He went to New York and Philadelphia as his duties called him, and about a year afterward he came back to me. His tonsils were not much enlarged and appeared normal in every way, but I opened the capsule and found deep within the tonsil large cholesteatomatous masses which had an intensely disagreeable odor. Excision of the tonsil resulted in complete relief. I have observed this condition of the tonsils again and again. I have been surprised at times finding these large cholesteatomatous masses where there was no evidence externally. The point I wish to bring out is that it is not always evident on the surface of the tonsil that these masses exist in the crypts and folds.

I was interested in Dr. Stucky's remark in regard to the use of argyrol. I cannot agree with him at all, and I cannot see where it would be of any value. I have used this agent in solution from 5 to 30 per cent. and have been uniformly disappointed and cannot see how it would be of any value whatever.

Dr. G. Hudson Makuen, Philadelphia:—I have been interested in the subject of this paper for a long time. In the first years of my study of the diseases of the throat I recognized the importance of getting rid of these little receptacles in the tonsillar niche. While I did not go into the subject as thoroughly as Dr. Pierce has done I had made two knives which had the cutting surface at right angles to the shaft. I think I exhibited these to this society the first time it met in Washington.

Our chairman, Dr. Jackson, has devised similar knives, but mine differs from them in having sharp points. Danger may lie in the point of the knife if due care is not taken. I insert it into the fossa or crypt, bury it in the most dependent part, and then bring it out toward the middle line of the pharynx, opening up the pockets entirely. To keep the pockets open I scar the edges of the wound with the actual cautery. I have seen much good come from the above treatment of these conditions.

Dr. H. W. Loeb, St. Louis:—I should like to ask the essayist if he has succeeded in finding cholesterin in the masses. The method of treatment is to open up the sacs to as great extent as possible and maintain the opening and cause obliteration as far as possible of the limiting walls. To me it seems to be impossible to maintain this opening by simply making a slit unless something is done to prevent the contact of the two sides. My practice has been to use the electrocautery knife. I prefer to do it with a simple knife if possible, but to me it does not seem likely that the opening can be maintained after making a mere slit. With the electrocautery it is possible to destroy a portion of the limiting walls of the cavity. I think the subject is exceedingly interesting, and it speaks very well to have the President of our section bring up this important subject, which is being studied so extensively.

Dr. Pierce:—I first open the sac thoroughly, then curette it with a sharp curette, and then I fill the cavity with a thirty-five per cent. solution or saturated solution of argyrol.

In regard to cholesterin crystals, they are found in the masses. It is a question if they are always present, but they have been found.

In regard to keeping the spaces open the whole subject is embraced in just that point. Personally I have had more success by tearing them open the fifth, tenth or twentieth day, after first incising them and after the bleeding ceases I use nitrate of silver, fused on a copper probe or a cautery for the cut surface. These cavities are not obliterated. The tonsil is removed, and the epithelium lining the crypts or cavities joins the epithelium from the surface of the tonsil. Staining this cholestatomatous tissue is difficult. In fact there has been no satisfactory staining. If we should study the tonsils with a view of finding out the exact nature of the disease, I think we would reach unexpected conclusions.

This tissue is capable of invading the tonsillar tissue just as cholesteatoma in the mastoid antrum is capable of invading the bone. There is much to be discovered and learned in this direction.

Report of a Case of Tonsilitis.

By Dr. John S. Mabon, of Pittsburgh.

The only interest connected with this case is the exhibition of the specimen, as the history is extremely meager, and I cannot exhibit the patient. This man, who was fifty-four years of age, presented himself at my office and said he had an interesting scientific specimen, which he, himself, had removed from his throat. He had complained for three months of a sore throat, frequent coughing, and often emesis from clearing the throat. He had once a very severe attack and expectorated the specimen from the throat. The only thing I could find on examination was the peculiar appearance of the arch on the right side, and introducing my finger, I found the cavity large enough to insert the end of my finger. My intention was to have a section made and the findings sufficient to make an analysis, but the expert

chemist said it was not large enough to make the examination. He thought it was composed of the chlorid and phosphate of lime. I had thought to have seen the patient again, but he did not present himself. He took the specimen from the mouth himself. The weight of it is one hundred and forty-seven grains.

DISCUSSION.

Dr. J. A. Stucky, Lexington:—The largest stone I ever saw was not near as large as a small pea, and I have nothing to add to this. I cannot account for it. I do not see how the man could get along with it in his throat.

On a Case of Aphthous Laryngitis.

By Dr. E. J. Moure, of Bordeaux, France. See Page 139.

Systemic Treatment of Naso-Pharyngeal Irritation.

By J. A. Stucky, of Lexington, Ky. See page 127.

DISCUSSION.

Dr. Wendell C. Phillips, New York:—Mr. Chairman, I must congratulate the reader for his attention to this subject and there will be little criticism in what I have to say. There is much more to the treatment of naso-pharyngeal inflammation both acute and sub-acute, than the application of sprays, astringents, etc. Experience is leading me to believe that remedies used for applications to the membranes do more harm than good and that only mild applications should be used, and I am inclined to think that internal treatment is more efficacious. Dr. Stucky has clearly described the character of this class of inflammations. Draughts of air receive more blame for colds than they should. Fatigue is oftener a cause of colds than exposure to draughts.

I have recently been treating a patient who was rapidly losing her hearing with severe tinnitus. She is a high liver, and takes practically no exercise at all. She complained of pain at the base of the brain. I recommended physical exercise. She took a long walk which was followed

by excruciating pain at the base of the brain. I feared apoplexy and so thought that kind of exercise would not do, but recommended milder exercise and internally a solution of salicylate of soda made from Merck's oil of wintergreen, thirty grains daily. I cauterized her Eustachian tubes, regularly and gave special directions to her exercise; stopped the use of stimulants; and continued the internal use of the salicylate of soda. The result has been that her tinnitus is well and the pain at the base of the brain is gone. Cheerfulness has replaced her depression, and hopefulness has inspired her. Her endurance has greatly increased and she has given up the idea that she is going to become perfectly deaf. The result has largely come from the administration of salicylate of soda and exercise. The method of Dr. Stucky is good but largely impractical, because most patients are so busy that they prefer some treatment which requires less time, and most cases may be cured by simple means.

Dr. T. P. Berens, New York:—I would like to thank Dr. Stucky for his able paper and hope he will keep pounding it out to prevent our getting into the rut of only local applications and nose douching.

As Dr. Phillips has remarked very aptly we do not get this disease as well marked in New York and Philadelphia as they do in Kentucky. I have seen no cases where it was necessary to put the patient in the hospital for a week or two. Climate, diet and hygiene surroundings have much to do with these things, and it is possible that the amount and variety of food and drink and the climate, together, have something to do with the nonelimination and may probably cause a much more severe type of pharyngitis in Kentucky than we have in New York or Pittsburgh. In speaking with Dr. Phillips of a similar condition he asked me what local application I used. I told him mercury and chalk thrown up into the back of the throat, together with the administration of some saline the next morning. Sometimes I have used the calomel and chalk preparation for the throat, and individually I prefer this application.

There is another class of cases that Dr. Stucky just mentioned, and that is where the patient complains of a sensation

as of cinders, fish bones, or bread crumbs stuck in the throat or tonsil. These cases are similar to such a condition as Dr. Pierce described to-day. They may have a little accretion in the tonsil or they may have some other condition in the naso-pharynx, which will require attention. While giving this attention do not forget the little gray powder occasions ally, and if the patients have been brought up under some other school than ours you will not hurt their sensibilities.

Dr. C. W. Richardson, Washington:—This subject is an interesting and important one. I think we all have noticed the great importance of systemic medication in most of these cases.

Dr. Berens and Dr. Phillips live in a state where there is a continual rush, and men have only time there to eat and to work, all else must give way. We men who live in rural districts find that the patient is willing to give up a little to get well, and will submit to lines of treatment which we prescribe. I think if the doctor would suffer from some of these diseases, he would recognize how willing the patient is to overcome them. Last spring I was affected with a condition which the reader has not referred to, and that was a neurasthenic vasomotor catarrh, which afflicted me nearly six months. I know of nothing so distressing and annoying as to retire after the day's work with the hope of a restful night, to be awakened with a complete vasomotor stasis in the nasal chamber, or by a violent laryngeal spasm and a distressing cough. I think anyone who suffers with this or the other type will readily see how willing the patient is to submit to any form of treatment to relieve these conditions. I think we pay too little attention to these various forms of systemic infection with local manifestation and attempt to do too much in a local way when the treatment should be largely of a systemic character. We meet besides these catarrhal conditions of the nasal tract, those neurasthenic cases which also demand a special form of systemic treatment. We can relieve to a certain extent this vaso-motor stasis by local applications, but it is not enduring and permanent in its effects. There is only one course of treatment which will relieve these individuals and that is of a systemic character. Their work should be cut down and their ner-

vous waste should be arrested, they should be given more out of door life and other general treatment, which we all know are applicable to these cases. Without this we cannot bring about a restitution to the normal condition either in a local or a general way.

Dr. W. S. Bryant, New York:—I think Dr. Stucky did not mention one of the chief causes of lithemia, and that is nervous exhaustion. This is one of the most prevalent causes in the east.

Dr. Stucky's method of treatment, I think, if followed out would lessen in a marked degree the cases of middle ear catarrh. Dr. Phillips hinted at this fact, I think, that if prophylaxis as far as the middle ear is concerned were followed out that probably fifty or seventy-five per cent. of the chronic catarrh condition of the ear would be done away with.

Dr. H. W. Loeb, St. Louis:—I think these well recorded memoranda on the on the part of the essayist deserve close attention. The essayist has made these observations in a careful and systematic manner, and has succeeded in finding indicanuria present in nearly all cases, and I think that is an important matter. Here is a proposition in which an acute or sub-acute naso-pharyngitis is accompanied invariably by indicanuria, which the essayist thinks significant of auto-intoxication. Now, this is getting down to the basis of the trouble, and for that reason, whether or not Dr. Stucky's observations are confirmed, he will have the merit of suggesting the local expression of a general condition.

It is possible that patients are particularly prone to this sort of pharyngitis in Kentucky, where whiskey drinking is common. In beer drinking communities, it is far more uncommon though it does occur when beer is drunk in excess and for a long time.

Dr. Stucky:—I think some of my most remarkable cases have been from the east, from New York and Pennsylvania. The worst cases are not indigenous to Kentucky.

Regarding the point made by Dr. Phillips about the use of salicylate of soda, most of you recall the fact that I am a warm advocate of this drug, but I think if you would use salicylate of stontium you would like it better.

If the patient really wants to get well I believe you can get better results in ten days with the treatment I outlined than in ten weeks under other treatment. If the patient wants to get well he is willing to pay a trained nurse or go the hospital and spend the night. They do not object to the treatment as the relief and comfort is so marked. I have never had a patient complain.

I am glad Dr. Richardson spoke of the neurasthenic vasomotor disturbance. He did not get the condition in Kentucky, as he came there with it. Now as to the cause of the vaso-motor trouble the neurasthenia is not the cause of the lithemic condition, but the same cause produces both. I do not know much about indican, but I know that when we find it and get rid of it the patient is relieved.

When I suspect a case of naso-pharyngeal irritation I always have an examination of urine made for indicanuria.

**Report of a Case of Primary Involvement of the Sigmoid Sinus Following an Acute Otitis. Operation.
Recovery.**

Paper by Dr. James F. McKernon of New York. See page 104.

Report of a Case of Infective Sigmoid and Lateral Sinus-Thrombosis. Operation Jugular Exsection.

Paper by Dr. Ewing W. Day of Pittsburgh. See page 19.

DISCUSSION OF THE TWO FOREGOING PAPERS.

Dr. N. H. Pierce, Chicago:—Mr. President and Gentlemen: These two fortunate cases should make the operators very proud, as they do not all terminate so favorably.

Regarding the case reported by Dr. McKernon, the title is misleading. It is a primary isolated thrombosis of the jugular bulb with extension to the sigmoid sinus.

Regarding the absence of chill and desudation in both of these cases I would say I believe it is rather peculiar to children in septic conditions that these two symptoms are less frequently present than in adults. We very frequently miss the chill and the sweat, and it is important to remember this

as we are liable to be misled if we look for these two symptoms as being constant in children.

The other point with which I will close is the postoperative temperature in Dr. Day's case. I think it is very rare, if ever, that we have such extensive involvement of the cephalic veins with no postoperative rise of temperature.

I remember a case of my own which recovered and which ran a temperature of 101-103 from the time of the operation until he got out of bed, which was three or four weeks.

We cannot eliminate septic material entirely by our operation, and nature helps us out with the sepsis, and more or less elevation of temperature is always to be expected. I believe every case should be examined for the bacteriologic findings at time of the first visit. I make not only smears but gelatin tube culture in each case. I believe the prognosis and after-treatment will be greatly aided in this way. Lately there are appearing some articles which tend to throw doubt on the value of the information derived from bacteriologic examinations of ear disease, but my experience leads me to believe that such an examination is of great assistance.

Dr. W. C. Phillips, New York:—I would like to call attention to two points. First, that Dr. McKernon did not attempt resection of the jugular vein. He was sure that infection had gone into the general circulation, and also that resection of the internal jugular vein in a young child is attended with grave consequences. I believe Dr. McKernon was wise, and I shall always do this if the symptoms do not show involvement further down. We should be careful how we resect the jugular vein in children. I have seen it done several times but never saw one get well.

The other point is with reference to the examination of the pus in these cases.

We should get the pus as early as possible, if we wish to have bacteriologic examination made.

Dr. T. P. Berens, New York:—I congratulate Dr. McKernon on his success. It seems to me, however, that the best surgery in dealing with cases of sinus thrombosis is to cut off the general circulation by ligating the veins before attempting to disturb the clot by curetting it from the sinus.

I have removed the jugular vein from a baby nine months old, and the shock was absolutely nil. I have seen children under three years of age with septic thrombosis of the lateral sinus get well after the vein was removed, and I do not think the shock was great.

Tinnitus Aurium.

Paper by Dr. W. S. Bryant. See page 111.

DISCUSSION.

Dr. H. W. Loeb, St. Louis:—There is a very little in this paper to discuss, except to state that the classification is very ingenious and seems to cover every point.

The question for discussion would be whether or not the classification given is along the lines we would expect in such a symptom as this. It certainly enters into a deeper classification of tinnitus than I have been able to do myself. I would like to state that Babinski, a French neurologist, has been affecting some good in tinnitus by lumbar puncture.

Dr. J. A. Stucky:—I would like to ask a question concerning a very peculiar case and would like to know what is the matter and what to do with it. The young man is an athlete, twenty-one of age, and healthy in every respect though of a very neurotic temperament. He complains of a constant buzzing noise in his ear when he is alone. I can find no trouble in the ear. There is a little thickening on the floor of the nose, but not enough to interfere with drainage and ventilation of the tympanic cavity. This is worrying him considerably.

While reading your paper I was wondering under what head I would put this fellow. Is it a psychic trouble or is the trouble organic? He has had it six or eight months.

Dr. W. S. Bryant:—Referring to Dr. Stucky's attempt to make the diagnosis, I think the only way it can be done is by elimination. If we rule on the condition of the pharynx and lithemia and rule out the disease of the middle ear and the labyrinth then we come to the nerve. If we follow along the nerve we come to the psychic functions. I think Dr. Stucky said his patient has some sort of neurosis.

This condition has often much to do with the gravity of the symptoms of the tinnitus. If the patient is not nervous I think the tinnitus does not worry him very much, but the more he listens to it the louder it grows, and although tinnitus may not be of any considerable volume, it may finally bring the patient to the verge of insanity. In a psychic case a little mental discipline is what the patient needs. If you cannot discover the cause of tinnitus or are unable to remove it, it is very likely of nervous origin. If the patient is constantly thinking of it, he will hear nothing but tinnitus, both day and night.

Laryngitis Hypoglottica Acuta.

Paper by Dr. C. W. Richardson, Washington. See page 106.

DISCUSSION.

Dr. T. P. Berens, New York:—The series of the cases that I have seen similar to the condition described by Dr. Richardson have been different only in that they all were older. I have seen several cases under six years of age, but most of my cases have been from eight to twelve, and adults.

Dr. Richardson has given a beautiful clinical picture. I think he left an important factor out, namely: rheumatism, in the etiology. I saw a case in a child nine years of age, with a distinct family history of rheumatism, at the time with rheumatism of the knee joint. She had swelling of the false cords and slight injection of the true cords, with marked swelling of the arytenoid region and inter-arytenoid space. This case cleared up rapidly under the local treatment of adrenalin and the internal administration of large doses of salicylate of sodium. A few weeks later the child had rheumatism in the knee on the opposite side, and also laryngeal involvement. It has been more than one and one-half years since the last attack. It cleared up entirely under the salicylate of soda. I have seen several similar cases of undoubted rheumatic origin in adults and children simulating laryngismus stridulus and in those children in which an examination could be made I could find the cords scarcely altered, usually however finding the false cords swollen and swelling

about the arytenoids and aryteno-epiglottidian folds. Unless the child permits a laryngeal examination to be made it is difficult to distinguish between this condition and diphtheria and the ordinary spasmodic croup in children until the disease has progressed sufficiently to permit of a diagnosis by other than local symptoms. When we get adults it is difficult to diagnose between this condition and specific laryngitis in its very early stages. A few days however will always suffice to clear up the diagnosis.

I would like to thank Dr. Richardson for calling our attention to this subject again, and I am glad to have had an opportunity of presenting this case of genuine rheumatism of the larynx in connection with the rheumatism in the joints. Local treatment gives comfort to the patient, while it gives time for the general treatment to take effect.

Dr. J. A. Stucky, Lexington:—I would like to ask Dr. Richardson with respect to the strength of the solution of silver nitrate. (Reply, 1 per cent. solution). I have used this remedy and had very ugly results. The reaction following the irritation caused almost complete stenosis.

I am very glad to emphasize the point made by Dr. Berens as to rheumatism being the cause. I have seen many cases in which rheumatism could be traced as the cause. In the transactions of the International Congress held at Washington, is a case which I reported there. The patient died before I could get to the house from my office with the tracheotomy tube. I have seen many of the cases relieved by the treatment which relieves acute rheumatic disturbance, namely: very free purgation, active diaphoresis, and large and frequent doses of salicylates.

Dr. Richardson:—I think Dr. Berens' case was a pure case of rheumatic laryngitis.

Nasal Aprosexia.

Paper by Dr. G. Hudson Makuen of Philadelphia.

DISCUSSION.

Dr. H. W. Loeb, St. Louis:—Mr. Chairman, the case presented by the essayist is a very interesting one, and the explanation by the essayist as to why the cure is not complete is very well founded. I think we can all accept the influence of the aprosexia and the trouble in the antrum as the cause of the lack of further improvement in this case. I think the result is very good, as the case was a bad one.

I think Dr. Makuen has been laboring to get our colleagues interested in speech defects, but I do not think he has been as successful as he deserves to be. I think it is a subject in which every laryngologist should be intensely interested. Many cases could be relieved by a little attention and practice in the proper direction. Many children are kept from proper schooling on account of defects of speech. It is quite as important as the relief for instance of the minor affections of the nose and throat.

Dr. Means:—I was very much interested in Dr. Makuen's paper because it comes so near home. I was a stammerer from the sixth to the ninth year of my life. They told me it came from a scare. I was asleep on the cellar door when a thunder storm came up which frightened me so badly that as a result I was a stammerer for three or four years. I have a boy at my home who is a stammerer and who changes the form of stammering as often as he changes his residence. Sometimes he will stall on the consonants; this lasts for three or four weeks, and then some other form come along. If he stays at home and we are careful not to get him excited, he has no trouble. The teacher has no trouble in school; says he is as bright as the other children, but occasionally takes a spell which lasts for a week. It is the change of type of stammering which is most unique in his case. If he goes to a party he will probably have some new type when he comes home. I am not well enough posted in the process to educate the child to stop stammering.

Dr. J. A. Stucky, Lexington:—I would like to ask a question of Dr. Makuen. He mentioned hypnotism, and I would like to know if it was hypnotic sleep or hypnotic suggestion.

Dr. G. Hudson-Makuen, Philadelphia:—It is important that the treatment of stammering should be kept within the medical profession, instead of being relegated to schools in which the condition is not well understood, and the patients are required to pay large sums for no value received. No one should be so capable of dealing with this affection as the laryngologist, for he knows something of the organs in which the difficulty exists. He may not know the mental peculiarities of the stammerer but these can be easily understood with a little study and practice. No two persons stammer in just the same way, but each one presents a type which is peculiar to himself and from which he may depart slightly from time to time.

I have used the milder forms of hypnotism in a few cases, but only for the purpose of putting the patient in a condition to receive the training. This boy when hypnotized will give his whole attention to the work, and he can not be induced to do this in his normal state. Of course hypnotism of itself will not cure stammering, but in a very limited number of cases I have found it of value in helping to control the mental processes of stammerers. The result of its employment was little short of marvelous in one of my recent cases.

Replying to Dr. Phillips question would say that only about 5 per cent. of my cases have been girls. Some one has said that stammerers think faster than they talk, and that therefore girls do not stammer. Joking aside, however, it is well known that girls naturally have greater fluency of speech than boys, and this helps to explain the fact that they less frequently stammer.

Laryngeal Stenosis from Post-Typhoid Perichondritis, Tracheotomy, Thyrotomy, Intubation. Exhibiton of two Patients.

By Dr. Chevalier Jackson and Ewing W. Day, of Pittsburgh, Pa. See page 24.

DISCUSSION.

Dr. C. W. Richardson, Washington:—Mr. President, I was much interested in the cases reported. It is a thoroughly interesting subject. Perichondritis is one of the unusual complications of typhoid fever. Perichondrial involvement usually seems to be the most severe type, and the few cases which I have seen were the same intense form as described by Drs. Day and Jackson.

I have nothing to suggest in the matter of treatment. The treatment they carried out seems to be the only one which can be instituted. One case which I had, died after I had gotten it to where a good sized intubation tube could be introduced. The tube was coughed out one day and there was almost immediate stenosis, and before the patient could be tracheotomized he died.

The second case after wearing the tube six months in perfect comfort, went home and I have not heard from him since. The treatment was practically the same as in those of Drs. Day and Jackson except I introduced the intubation tube almost as soon as the wound healed. I did not have the tracheotomy tube which they are using and which I consider a decided advancement.

The resulting improvement must be greater with this method than the early introduction of the intubation tube. I cannot see that the ultimate result is one promising great comfort to the patient. I doubt very much if we can ever get them into such a condition so that we can displace the intubation tube entirely. Very few ever get over the dread of losing the tube. The case, of which I spoke, which died, constantly feared the accident happening which finally ended his life.

Dr. E. W. Day, Pittsburgh:—I believe as laryngologists we are inclined to shun opening the larynx. We will open it oftener in the next ten years that we have done in the past. We have groped too much in the dark in the case of tumors and other abnormalities, and I believe the sooner we abandon this mode of operative procedure and open the larynx and work in a clear open field under direct inspection the better it will be for our patients. Thyrotomy is not a difficult op-

eration and not one which is usually very risky. The great point in these cases of stenosis is the after treatment. If you have not time to stay by the case and put in faithfully several hours a week for several montas, then do not do it at all, for it will be a failure. There is much more in the after treatment than in the surgical.

Dr. Chevalier Jackson, Pittsburg:—In closing he said that the accident spoken of by Dr. Richardson was the very thing that the T shaped tube was devised to prevent. It held the laryngeal lumen widely open till healing had taken place, till cicatricial contraction was completed, till a permanent lumen lined wiith epithelium had resulted. While this was going on, the patient was perfectly safe because of the maintenance of the opening in the neck till the result just mentioned had been obtained, when the intubation tube was inserted to allow the tracheotomy wound to close—only about a half of a square inch in area on the inner tracheal surface. At this time there will be no danger if the intubation tube be coughed out, because the inflammation has subsided, and there is no edema or swelling. Whatever might be anticipated ultimately, there is no dyspnea in either of these cases upon removal of the tube, as many instrumental removals in both these cases had demonstrated. As mentioned in the paper case, one had the tube out for a whole month. It would be very different if the intubation tube were inserted immediately after the thyrotomy. For a month at least the unhealed mucus membrane with its attendant inflammatory phenomena would be apt to cause an immediate dyspnea from stenosis, should the tube be coughed out.

Report of a Case of Labyrinthine Disease.

By Dr. John K. Sterritt, of Pittsburgh, Pa.

Dr. Ward, Pittsburg:—Mr. Chairman, I have not anything to say on this report. A few minutes ago the Dr. mentioned to me the name of the patient who presented such unusual symptoms and I recalled at once that this was the first patient whom I ever intubated. He was then but a small child two or three years of age, and I think suffering from the disease which Dr. Richardson described a few minutes ago. He made a

rapid recovery after intubation.

I was always under the impression that any disturbance of the internal ear was attended with more marked symptoms than was experienced in this case. I think it is rather remarkable on account of the absence of any pronounced symptoms.

Dr. W. C. Phillips, New York:—I would like to add a word because I have seen and operated on many cases and frequently found some portion of the internal ear involved. I do not recall that it is at all unusual to find such involvement in patients who have not shown vertigo and other symptoms often associated with such involvement. I remember one case in which the whole internal ear was affected without any marked symptoms.

Dr. Rae, New York:—This very interesting case seems to me to admit of an explanation. We have here a history of prolonged suppuration, attended with caries, and finally with the separation of a large sequestrum including one of the semicircular canals. Now, had the gross disarrangement in the labyrinth, caused by occlusion of one canal, been coincident in point of time with the separation of the sequestrum, it is evident that most pronounced symptoms would have resulted. But such has not been the case, and it is only fair to conclude that the occlusion of the semicircular canal had long preceded the separation of the sequestrum; and further, that the process by which the occlusion was affected, was a very gradual one, admitted of a complete maintenance of equilibrium in the labyrinth throughout.

From such a case we are justified in concluding that a sudden disturbance of intra-labyrinthine pressure, although the exciting cause may itself be comparatively trifling, will be attended with most distressing symptoms, while such a grave, gradual change as that described by Dr. Sterritt may be noted for its entire lack of symptoms.

Dr. T. P. Berens, New York:—I have seen several of these cases in which there has been a disturbance. Dr. Rae's reason, I think, is a very good one, but I think we must go further and remember that when the semicircular canal is removed we get no vertigo. If it is only injured we get marked vertigo.

In Dr. Sterritt's case it seems it was practically complete acclusion of the semicircular canal.

Dr. W. S. Bryant, New York:—I think Dr. Rae is right because this has been a chronic condition. I think it is not uncommon to have considerable necrosis with exfoliation of the bone without destruction of the adjacent part. We can lose the cochlea and still have the semicircular canals, and vice versa.

Dr. J. K. Sterritt:—I did not mean the case to be anything unusual, but lasting that length of time it seems to me there should have been some tinnitus, where there was no tinnitus and no vertigo. Also that the case should be a lesson both in diagnosis and prognosis, as well as in preventing errors of treatment.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINO-
LOGIC AND LARYNGOLOGIC LITERATURE.

I.— EAR.

**A Case of Mastoiditis; Sinus Thrombosis; Pyemia; Two
Operations; Recovery.**

THOMAS R. POOLEY, New York, N. Y. (*Medical News*, January 16, 1904.) The patient was a stout girl of 25 who had been in attendance five weeks before on her sister who died of puerperal septicemia. Following an attack of grippe there was earache on the left side, followed by rupture of the drum and free discharge, with marked pain, tenderness and swelling confined to the mastoid region. The discharge showed abundant evidence of the presence of streptococci. The appearance of the patient was that of profound infection; temp. 101.6; pulse 120; respirations 30. Immediate operation done. Outer table softened, necrotic. Cells filled with dark blood and granulations. Cortex removed to the tip. On attempting to enter the antrum with the rongeur, the sinus, position of which was abnormally far forward, and its wall extremely thin from caries, was accidentally opened, giving rise to profuse hemorrhage which was quickly arrested. A discolored point was seen upon the sigmoid roof. All dead bone and granulations removed. The following day her temperature dropped to normal, pain ceased, condition good. Two days later wound looked aseptic. Temp. 100, pulse 86, respiration 28.

Two days later, March 12, temp. 100.4, wound sloughy, periosteum detached from the bone, profuse, offensive discharge from the wound. Sinus cleansed, gauze re-inserted.

Distinct redness and tenderness in the course of the jugular vein, and acute tonsillitis next supervened. This was followed on the 15th by general aching and a painful arthritis of the middle finger of the right hand. There was

suppuration and a gangrenous appearance of the posterior flap of the wound. Temp. 103.

March 16, severe chill, temp. 103.6; pulse 130; respiration 36, choked discs in each eye. Diagnosis of a septic thrombosis made.

March 17, original wound opened, all the remaining bone covering the sinus removed, and the covering then slit with straight scissors in its long axis. It was found to be filled with a firm fibrinous clot, which was removed with a sharp spoon and the blood current re-established in this direction, this part of the sinus then being plugged with iodoform gauze. The exploration was then continued in the descending portion of the sinus toward the jugular bulb, which was also found to be filled with a purulent, disorganized clot. On removal of this no blood current could be re-established, so the curette was carried into the jugular, removing clots and pus.

Ligation of the jugular seemed to be imperatively demanded, but the patient's condition was too poor. The pulse was rapid (140 or more) and very feeble; the respirations were very frequent. More or less forcible manipulations were now made on the jugular vein and neck, by which means quite a quantity of blood, streaked with pus, escaped, followed by free and copious hemorrhage. This method was resorted to with the full knowledge that it has been strongly condemned, because of the author's unwillingness to leave any obstruction, and the assurance that the patient who was almost moribund, could not longer survive any operation. The operation was then hastily terminated. No sutures were employed. The exposed dura was covered with iodoform gauze, both ends of the sinus plugged with the same, and bandage applied. Hypodermics of ether, whiskey and strychnine in considerable quantities were required for the next twenty-four hours, during which the temperature ranged from 103 to 103.6.

On March 19 the wound was dressed; very little pus. There was pain in the right ankle.

On March 20 the ankle was painful, red and swollen. The wound discharged profusely.

On the 24th the temperature went to 104.6; pulse 131;

respiration 52. Physical examination revealed a pneumonia of the right lung. Recovery took place from the pneumonia. An abscess formed in the upper part of the right arm and later over the left buttock, followed again by two abscesses.

On May 29, a large sequestrum of bone, 3 cm. long, by 1 1/2 cm. by 8 mm. was removed. This consisted of a portion of the mastoid and squamous portion of the temporal bone. Healing progressed more rapidly after this, and on June 11, nearly four months after admission, patient was discharged with a small area of wound unhealed, but the sinus and antrum wounds entirely healed.

This case is remarkable on account of the severity of the symptoms and the co-existence of a pneumonia with an extreme degree of pyemia, followed by recovery. The author thinks that it is most probable that the sinus was infected at the time of the first operation, as for three days thereafter improvement took place. Then the sinus clot formed with the subsequent appearance of the symptoms so characteristic of sinus thrombosis.

Richards.

The Great Value of Drainage and Ice in the Early Stages of Mastoiditis.

SARGENT F. SNOW, Syracuse, N. Y. (*Jour. Amer. Med. Asso.*, January 2, 1904.) The author begins his treatment by what he calls a tympano-Wilde's or tympano-canal operation, cutting the drum in the posterior half from the lower border upward to and through the attic folds, outward along the superior posterior wall of the external auditory canal. In most cases momentary anesthesia is necessary. This is followed by hot irrigations in the external canal, using a quart of water heated up to 115 degrees every 20 minutes. As soon as relief is obtained, constant cold by means of a Sprague ice-bag is applied to the mastoid and kept in immediate contact therewith for hours, without marked intervals in the renewing, as the ice application to be effective should be constant, continuous and prolonged. He has kept the ice bag on as long as six days, and this with the constant, continual application of the ice, does much to reduce morbid activity and hasten recovery. The fact that we have a tender mastoid, projecting auricle, prolapsed su-

perior wall, high temperature and previous discharge need not tell us to proceed immediately with the external operation, but does tell us that we must at once improve the drainage and combat the inflammatory action. *Richards.*

Some Recent Experiences with Chronic Suppuration of the Ear.

PHILIP HAMMOND, Boston. (*Jour. Amer. Med. Asso.*, January 2, 1904.) A chronic discharge from the ear is always a potential menace to life. Three cases are cited illustrating this: In one a prompt and satisfactory recovery took place after the operation of removal of the ossicles. In two others an acute attack took place and death resulted, in one from septic meningitis and the other from necrosis of the brain.

When caries is limited to the ossicles, ossiculectomy can be performed with a fair prospect of cure, but when let to extend farther the so called radical operation with thorough exploration of all possible fistula avenues should be performed. The question of the influence on the hearing should not be allowed to decide as to the operation. *Richards.*

The Efficacy of the Treatment of Acute Purulent Otitis by Aseptic Drainage.

H. GRADLE, Chicago. (*Jour. Amer. Med. Asso.*, January 2, 1904.) Free incision of the drum membrane is performed as soon as the diagnosis is made and continuous absorption of the discharge maintained by an aseptic gauze drain in the meatus and a large dressing over the auricle, both meatus and auricle having been previously sterilized with carbolic acid solution and powdered with boric acid. The external gauze pad is changed as soon as moisture appears, while the tampon in the meatus is left from 24 to 48 hours. If this method is carried out thoroughly the discharge in most cases can be kept serous. *Richards.*

On a New Symptom of Hemoglobinuria, Cyanosis and Gangrene of the External Ear.

ROHRER, Zurich. (*Archives of Otolaryngology*, Vol. XXXII., No. 6.) A well-nourished man, aged 32, with a history of acute

rheumatism and gonorrhea, after severe exertion and exposure to cold, showed bluish discoloration of both auricles most marked at the helix margin in the neighborhood of the Darwinian tubercle.

The urine contains albumen and blood pigments.

On the left auricle superficial gangrene developed, but by tonic treatment, rest and diet, all symptoms had disappeared at the end of four months.

Campbell.

On the Pathology and Treatment of Chronic Purulent Otitis.

SUCKSTORF, Rostock. (*Archives of Otology*, Vol. XXXII., No. 6.

I. Indications for the removal of the hammer and anvil.

Kessel gave the following:

1. Intractable stenosis of the tube.
2. Total calcification of the Mt.
3. Caries of the ossicles.
4. Anchylosis of the stapes associated with disturbing tinnitus.

5. Cholesteatoma of the tympanum and of the mastoid process unimproved by usual method of treatment.

The first two indications are so rare that they may be disregarded. The fourth has been abandoned on account of questionable results obtained, and in the case of the fifth the radical mastoid operation is performed. Ossiculectomy is also indicated in caries of the attic with or without caries of the malleus and incus, and likewise in cases of mucopurulent attic inflammation which does not respond to palliative treatment. This operation obliterates the complicated pockets formed by the ligaments and folds of mucous membrane passing to the ossicles.

II. Relative frequency and localization of disease of the ossicles.

In a series of 106 radical operations:

The malleus was found diseased in 36 per cent. and absent in 48 per cent. of cases.

The incus diseased in 24 per cent. and absent in 69 per cent.

The malleus was usually affected in the region of the head, and the manubrium and the incus the region of the long process.

Campbell.

Manifestation of Traumatic Hysteria in the Organ of Hearing.

BARTH, Sansburg. (*Archives of Otolology*, Vol. XXXII., No. 6.) Two cases are reported—the first a girl, aged 11, who was frightened by a dog leaping at her in the dark. Bilateral deafness, without treatment, disappeared in eight days.

A week later she had another fright and complete bilateral deafness with unconscious perception of musical sounds persisted for two weeks, when hearing returned to normal.

The second case, a healthy farmer, aged 21, who, a few hours after diving, claimed that a little blood oozed from the left ear. Next day there was difficulty in hearing on that side, and two days later bilateral deafness with no apparent sign of trauma or of an inflammatory process. A complete sensitive, sensorial hemianesthesia developed on the left side of the body with hyperesthesia over the mastoid process.

Unconscious power of hearing musical tones was retained. The visual field was greatly contracted. The condition having persisted for months renders the prognosis unfavorable.

A history of insanity appears on his maternal side.

Campbell.

On the Causation and Prevention of Bone Necrosis in the Course of Chronic Purulent Otitis.

SCHEIBE, Munich. (*Archives of Otolology*, Vol. XXXII., No. 6.) The author excludes tuberculous middle ear suppurations because necrosis is a constant condition and its cause is well known.

The aditus and antrum were generally both affected:

The antrum 13 times.

The aditus 12 times.

The tympanum 4 times.

The tube 1 time.

Of 17 cases, cholesteatoma of the upper middle ear cavities was present in 16.

There was fetid pus in 16 of the 17 cases; from this it would seem that cholesteatoma only produces necrosis when pus is fetid.

In all 17 cases, a retention of pus could be demonstrated, either by the masses of cholesteatomata or by polypi and granulations.

The prevention of putrefaction of pus can in most cases be accomplished by antiseptic irrigations with the tympanic canula. Where fetor persists operation is indicated.

The author's observations lead him to state that in chronic purulent otitis, with the exception of the tuberculous and the syphilitic, the appearance of necrosis can be prevented with certainty by proper treatment. *Campbell.*

On Primary Epithelioma of the Temporal Bone.

STURM, Rostock. (*Archives of Otology*, Vol. XXXIII., No. 1.) A man aged 42 with negative family history had a suppurating right ear since childhood. Eight months prior to coming under observation severe vertigo with noises in that ear continued for several days. Since then there have been intermittent pain and more recently a drawing in the right half of the head with some parietal tenderness.

On inspection a fistula is discovered in the upper and posterior wall which admits a probe to the depth of 1 cm. No perception of hearing on the diseased side, no facial paralysis, no glandular swelling.

Operation was undertaken under the supposition that the case was one of chronic mastoiditis, but instead a long cavity was found filled with tough, lobulated, yellowish-red masses which on examination proved to be squamous epitheliomata. The dura of the middle cranial fossa and the facial nerve were exposed. Further operative measures were refused and the disease was steadily progressive. He succumbed six months later. On autopsy, on the anterior surface of the right petrous bone a tumor larger than a cherry and to its inner side two smaller tumors, all connected and covered by the dura, were found. Thick pus escaped from the right internal auditory meatus. Near the right margin of the occipital foramen the dura is yellowish and elevated by tumor masses. The entire petrous bone was practically replaced by carcinoma. The transverse sinus was invaded and the carotid artery surrounded by the new growth.

The development of primary epithelioma in the middle

ear cavities is brought about by the growth of epidermis extending inward through marginal Mt. perforations.

Campbell.

On the Pathology of Deaf-Mutism. Report of a case of Acquired Deaf-mutism with Obliteration of Tympanum, Aditus and Antrum.

HOLZEL, Munich. (*Archives of Otology*, Vol. XXXIII, No. 1.) The changes in the temporal bone examined must be considered as the residue of a panotitis. In addition there was absence of the Mt., cholesteatoma; the tube, tympanum, aditus and antrum were obliterated, sclerosis of bone, bony occlusion of both windows; hyperostosis of bone on the inner and outer walls of the promontory and changes in the labyrinth.

The specimen had remained so long in alcohol, that nerve staining gave no results.

In this case the purulent middle-ear trouble must have been especially virulent, such as we find in infectious disease; and above all in scarlet fever. Moreover it must have taken place in early childhood, before the 7th year, since loss of speech followed.

Campbell.

Tuberculosis of the Ear Ending in Recovery.

HEGETSCHWEILER, Zurich. (*Archives of Otology*, Vol. XXXIII, No 1.) Four cases are reported where otitis media and pulmonary tuberculosis were coexistent. In one case only, did the otitis follow the classical course of tubercular infection.

In two of the other cases a greyish-white membrane was found, without the mastoid tip in one and on the promontory in the other. This membrane, Schmauss and Albrecht consider an initial stage of the caseation of tubercle and call it fibrinoid.

As regards treatment, any improvement in the patient's general condition is followed by a local improvement in the ear.

Convalescence is aided by antiseptic treatment in the tympanum; the insufflation of fine iodoform powder, after cleansing and drying, produces the best results.

Surgical intervention must be employed when scar tissue is to replace polypoid hypertrophy of the mucous membrane and caries of bone.

Campbell.

Tubercle-like Bacilli in the Discharge of Chronic Purulent Otitis.

DESIMONI, Milan. (*Archives of Otolaryngology*, Vol. XXXIII, No. 1.) These bacilli occur very frequently in milk and in commercial butter. They are found in infusions of several field herbs and in the feces of milk cows, hence their presence in milk.

They have been found in the most varied secretions from the oro-nasal cavity. They should not be confounded with the smegma bacillus, which cannot be cultivated on artificial media.

The cases reported where the bacilli were found in the discharge of chronic purulent otitis were those of a girl aged 9 and a man aged 26, both of good heritage.

The bacilli which grow in any media were longer and more slender than the common tubercle bacillus. They stain with the ordinary aniline dyes and are not discolored by gram. Inoculation of guinea-pigs and rabbits produced no lesions.

Campbell.

Osteomyelitis of the Temporal and Adjacent Bones of the Skull as a Sequel of Otitis Media Suppurativa.

RICHARDSON, Washington (*Archives of Otolaryngology* Vol. XXXIII., No. T.) The author reports two cases, the first of which he has previously reported in 1900. Case II that of a girl aged 14 who developed a mastoid abscess within 5 days of a Mt. rupture during an influenza otitis media. Tenderness and infiltration extended over the squamosa and posterior to the mastoid. She appeared very ill. Temp. never below 102° F. with an evening rise to 103° and 104° F. The antrum was opened and tip removed after which there was a temporary fall in temperature but it quickly rose again to 104° F. and higher; a septic pneumonia developed. On closely examining the operative wound pin-points of pus were seen disseminated over the bony wall. The wound was enlarged superiorly and posteriorly into the parietal and

occipital bones before all diseased bone was removed. Although the lateral sinus appeared normal it was opened as a precautionary measure. The convalescence was delayed by two intercurrent attacks of erysipelas. *Campbell.*

Contribution to the Study of the Endocranial Complications of Otitis Media.

LACARRE, England. (*La Presse Oto-Laryngologique Belge*, Vol. II.) Author describes a case of thrombosis of the lateral sinus following otitis media acuta complicated by caries of the petrous, and comes to the conclusion that in many cases operation comes too late and when there is caries of the petrous and the temperature shows great intermissions, a thrombo-phlebitis generally is to be found.

When there is no fever at the time of the operation the author does not think it necessary to make the sub-ligation of the internal jugular Mt. as proved in this case, in which the result was favorable. *Meyjes.*

Clinical Phenomena of Bony Complication in Chronic Purulent Otitis Media.

PROF. SCHIFFERS, Liege. (*La Presse Oto-laryng, Belge.*, Vol. II., No. 7.) Three cases of the ordinary complications in otitis media, cured upon operation. *Meyjes.*

Paracentesis of the Drum.

GUYE. (*Nederlandsch Tydschrift voor Geneeskunde.*) Deel II, No. 5, 1903. Guye also stays on the side of those who think paracentesis in cases of acute otitis media not only allowable but necessary when there is swelling of the drum, pain in or round the ear, fever, etc., and where no spontaneous perforation occurs within a very few days. He attributes the bad results of the use of the Politzer bag in cases of otitis media acuta, not to the dangerous high pressure with which the air is forced into the tympanum, (abstractor believes it does) but to the bag itself, when the insufflated air is not sterilized by cotton saturated with menthol. *Meyjes.*

Boric Acid Wound Dressing Without Packing After the Radical Mastoid Operation.

PROF. EMAN, Ghent. (*La Presse Oto-laryng Belge*. Vol. XII, No. 8.) In seven cases E. used for after treatment in radical operations only insufflation with boric acid without any packing. He is quite satisfied with the results. (Abstractor also satisfied with boric acid and aristol).

Meyjes.

A Case of Acute Labyrinthine Speech-Deafness.

M. GRONLEND. (*Hospitalstidene* No. 41, 1902.) The following interesting history is given:—A 15 year old ship's-boy, while his ship was in the tropics, suddenly was attacked by deafness, on account of which he was sent home; 5 months later he came under observation. The objective examination showed that the youth was normally developed, his intellect dulled, his speech uncertain and hesitating. He was careful not to use long sentences, and preferred to express himself as little as possible. There were signs of a mild otitis media catarrhalis. The examination of his hearing showed that he was absolutely unable to understand a remark or a conversation, but was able to distinguish the pitch of different tuning forks, selected at random, and he heard whenever any one whistled behind his back. The test by the Bezold-Edelmann tuning forks of his perceptions of notes showed a partial deafness on both sides, right from a to g, left from d to d" and from "g to a;" on both sides, he could not hear the lowest 4 notes of the scale. These findings are absolutely constant.

The partial deafness borders on the very part of the scale which, according to Bezold, is necessary for understanding speech. In this case, it is probable that an acute febrile disease, with which he suffered just before the appearance of his deafness, probably a mild cerebrospinal meningitis, was the cause of his disease.

In the course of 1 1/4 years his trouble became better, so that the patient, without seeing the mouth of the speaker, could understand short sentences. His musical understanding continued bad.

Joh Fred Fisher.

A Case of Thrombophlebitis of the Cavernous Sinus, Complicating an Empyema of the Sphenoidal Sinuses and Ethmoidal Cells, Mistaken for a Thrombophlebitis of the Lateral Sinus.

FINLEY, Havana. (*Archives of Otology*, Vol. XXXII., No. 6.) A seaman, aged 16, had left otitis media suppurativa for several weeks. Two days before coming under the author's care, the temperature rose to 104° F, pain in the ear became intense and a paracentesis was done.

Delirium supervened, the skin was cold and clammy, pulse 120, small and intermittent. Fundi normal; paralysis of the left external rectus.

On anesthetizing the patient, there was noticed a leechlike swelling parallel and a little above the left superior orbital margin indicating some obstruction to the flow of blood through the ophthalmic vein; and this together with the ext. rectus paralysis, showed the cavernous sinus to be involved.

The antrum and middle ear were exposed, the lateral sinus bared but on aspiration found healthy. The temporal fossa was opened and brain puncture in several directions proved negative.

Operation was unsatisfactory and unavailing. On autopsy no sign of pus or bone disease found in the neighborhood of the temporal bone. The pia at the base was the seat of a dense plastic exudation.

The cavernous and circular sinuses were occupied by a purulent clot, which extended into the left ophthalmic vein. The sphenoidal and posterior ethmoidal cells were occupied by thick yellow, fetid pus. The patient had never complained of or showed evidence of nose trouble. *Campbell.*

II.—NOSE AND NASO-PHARYNX.

Some Remarks on Chronic Sphenoidal Sinusitis.

ALBERT E. ROGERS, Boston. (*Boston Medical and Surgical Journal*, December 31, 1903.) The author finds that sphenoidal diseases is much more frequent than has usually been thought to be the case. In 600 patients at the

Massachusetts General Hospital he found 29 to be cases of accessory sinus disease or nearly 5 per cent. Of these 29 cases the maxillary antrum was affected four times; the frontal sinus once frontal; and ethmoid together twice; anterior ethmoid three times; posterior ethmoid two times; the sphenoidal sinus 16 times and a mixed posterior ethmoid and sphenoid once. This makes epyema of the sphenoid by far the most frequent and does not agree with the majority of clinical observations which have always placed the maxillary sinus as the most commonly affected. He did not find in the clinical records a single case of chronic sphenoidal sinusitis in the previous five years.

The probe should be the main reliance in the diagnosis. He thinks the sphenoidal the easiest of all the sinuses to enter and the one most commonly diseased. The probe must be passed in a direct continuation of the line from the inferior nasal spine to the middle part of the middle turbinate and must not go anterior to this line. The distance is $7\frac{1}{2}$ cm. from the inferior nasal spine to the anterior sphenoidal wall, and never more. Should the probe go a greater distance one is either in the sphenoidal sinus, brain cavity or the nasopharynx. If the probe goes over the turbinate in the middle part in the direct line mentioned, it is certainly in the sphenoidal cavity. The author has verified this measurement on more than 100 specimens. The probe must be bent with a slight horizontal concavity in order to pass around the convexity of the middle turbinate, and the tip also bent slightly downward as it is easier to enter the cavity and there is less danger of injuring the posterior wall. On entering the cavity and feeling roughened bone or spongy granulation tissue one is warranted in making a diagnosis of sphenoidal disease and justified in opening the cavity. Many obscure symptoms have their seat in sphenoidal trouble such as somnolency; numbness of the upper lip and general nervousness; pain in the head; pain in the back of the head; deep-seated pain over the eyes; post-nasal discharge.

He enters the cavity by cutting away the anterior wall with a Knight's cutting forceps and Grünwald's downward-cutting forceps so as to bite out the anterior wall and establish free drainage. So much of the middle turbinate is removed as may be necessary.

Reports of eleven cases in which the sphenoid was operated upon, and in all of which complete relief followed, are given. Severe headaches and dizziness were the most prominent symptoms complained of in the cases reported.

Richards.

The Window Resection Operation for Correction of Deflections of the Nasal Septum.

OTTO T. FREER, Chicago, Ill. (*The Jour. of the American Med. Asso.*, December 5, 1903.)

Resection of the Nasal Septum With Report of Fifteen Cases.

LEON E. WHITE, Boston. (*Boston Med. and Surg. Jour.*, April 21, 1904.) Dr. Freer's method has already been reported on and reviewed in this journal. The present paper records his later experience and brings the number of cases up to 60, all of whom have resulted favorably, and there have been only nine perforations and of these six were in his first fifteen patients. The cases cover all the varieties of deflected septum, not only of the cartilaginous but of the bony as well. A number of special instruments have been devised and illustrated. These make the operation much easier. Powdered cocain is used for local anesthesia.

The essential principle of the operation is the making of a vertical incision at the most prominent part of the deflection to very nearly the floor of the nose, and then a horizontal cut at right angles to this so as to form an inverted T. The mucus membrane is then carefully dissected off, the underlying cartilage removed, the mucous membrane replaced and held there with cotton tampons for a few days until it becomes attached. He has never had sloughing of the flaps.

Dr. Freer's paper should be studied in its entirety. His method was developed without any knowledge of the original workers in this field, namely: Krieg and Boenninghaus, so that his instrumentarium and technic are entirely original so far as he is concerned.

In a recent discussion before the Laryngological society of London, Sir Felix Semon in reporting on this new operation and its various modifications, gives full credit to Krieg, Boenninghaus, Krabe, Hajek and Menzel, but omits all ref-

erence whatever to Dr. Freer, whose paper very much antedates any publication in regard to the operation by Hajek.

Dr. White's article takes up the same subject, reporting good results in 15 cases with rapid recovery, lack of pain, short after treatment, freedom from sepsia and free from respiration 48 hours after the operation.

While giving full credit to Freer for the work which he has done in connection with this operation, he states that his own methods differ somewhat in that he has simplified and reduced the number of instruments necessary; makes only one incision as a rule, but occasionally if marked thickening or the deflection is extensive or far back, it is necessary to make a second incision parallel to the floor of the nose. He also sutures the flap, having devised a special needle-holder and needle for this purpose. He thinks that sutures are an advantage since they keep the edges of the wound in coaptation and frequently allow primary union to be obtained over a good deal of the area, preventing a tendency of the flaps to curl up. He packs the operated side with a number of loose cotton pledgets made from corrosive sublimate cotton, previously powdering the cut surface with Aristol. These remain from 24 to 48 hours. He does not pack the concave side. He cautions against using cocain and adrenalin on the concave side as he thinks where these agents are used on both sides that there is more danger of sloughing.

He has devised two knives for making the cut through the cartilage with the cutting surface relatively to the shank so short that there is very little danger of cutting through into the opposite side.

In his first six cases there were two perforations, while in the last nine, but one. As the edges of the perforation are covered with mucous membrane, they cause no annoyance to the patient afterward, although it is preferable to avoid them. In none of the cases was there any damage to the nasal profile, while in two of them where there was decided twist in the nasal tip, the deformity was greatly lessened, thus proving that the septum is not a support for the nose but only a division between the nares.

The operation as performed by him requires about 1 1/4

hours on the average, the first half of which is done in the upright position. When ready to remove the cartilage the patient is placed reclining on a high operating table with the head resting on an adjustable section so that it can be raised or lowered as it becomes desirable to illuminate any particular part of the septum. Dr. Freer does his operation in the erect posture but with every preparation to operate with the patient lying down should he feel faint while sitting. Both papers are well worth careful study as a full explanation of the operative details are given. *Richards.*

Clinical Experiences With the Enlarged Pharyngeal Tonsil.

GRADLE, Chicago. (*Archives of Otology*, Vol. XXXII, No. 6.) The author has seen the characteristic facial expression, or adenoid habitus, in children with suppurative rhinitis with narrow nasal passages and a normal or at most a very slightly enlarged pharyngeal tonsil.

Two cases were observed where asthma was apparently cured by removal of the growth.

Cough, reflex or due to a subacute bronchitis, frequently ceases immediately after an adenoid operation.

A large proportion of children with phlyctenular keratitis have adenoid, and removal of the latter is often of unmistakable influence upon the course eye disease.

In carefully kept histories of cases of inflammation of the Eustachian tube it will be found that they are preceded by inflammatory conditions of the pharyngeal tonsil; and as adenoids are subject to frequent spells of inflammation, it is the extension of the inflammation which proves a menace to the ear. The author considers the adenoid enlargement the consequence of repeated attacks of coryza during the first few years of life.

For removal of the growth the author has modified the Schnitz adenotome. *Campbell.*

Tertiary Nasal Syphilis.

POSTHUMAS MEYJES. (*Tydschr-voor Geneskn*, Vol. I., No. 26.) From eight cases of nasal syphilis the author concludes that tertiary syphilis is not so very seldom,

showing itself first either in the nose or in the naso-pharynx. What appeared to be an ordinary cold in the head proved four times the earliest manifestations of the trouble. In addition to the nasal obstruction there was supra-orbital neuralgia, unilateral mucous secretions, loss of olfaction and general mental depression. Temperature generally a little higher in the evening. There is in this stage little to be found in the nose—slight hypertrophy of the inferior turbinate bone; mucus; later an ulcerative process on the septum where the probe often strikes denuded bone. The secretion is purulent and bloody. In this stage differential diagnosis must be made from tuberculosis, lupus, malignant neoplasms, diphtheria and leprosy. The difficulty of diagnosis lies in the first stage when patients are really quite ignorant of any previous infection. In the author's cases the syphilis was manifested in the left side of the nose, and he, too, confirmed the opinion of others that an ulcer in the nasopharynx may be for a long time the only symptom of tertiary syphilis. *Meyjes.*

A Case of Congenital Atresia of the Choanae.

PROF. D. E. SCHMIEGELOW. (From the Oto-laryngologic Department of the St. Joseph Hospital.) *Sophus Beutzen Ugeskrift for Loege*, No. 20, 1903.) The case is one of a 30-year-old woman who had suffered from nasal trouble since birth; no air passage through the nose; power of smell = 0. The intellectuality slightly developed.

It was seen by rhinoscopy that the choanae were naturally formed, but just before frontal plane lie a whitish-yellow, bony membrane covered with normal mucous membrane. The height-index of the palate about 100. On both sides the diaphragm was destroyed by galvano cautery.

The author found 61 cases described in literature. Most of them had a bony membrane; exceptionally it was membranous. The diagnosis is not difficult.

John Fred Fischer.

**Remarks on the Vegetations on the Sides of the Naso-Pharynx
and Description of an Instrument for the Removal
of the Same.**

JORGEN MOELLER, *Hospitaletidnrde*, No. 20, 1903. (From the Clinic for Diseases of the Ear, Nose and Throat of the Commune Hospital, Prof. Dr. Holger Mygind.) The question of the appearance of the lateral vegetations is an old source of debate which must now be regarded as settled. They appear as long prominences, which lie chiefly in the Rosenmueller's groove; usually they affect both sides. The diagnosis is not always easy, and often can be made only when the true pharyngeal tonsils have been removed. The lateral vegetations are comparatively frequent in adults, which condition depends on the slight tendency of the vegetations toward spontaneous evolution, which, itself, without doubt is due to their firm consistency. The symptoms are the same as in ordinary adenoid vegetations.

The treatment in every case consists of instrumental removal, but the usual instruments do not suffice. Prof. Mygind, therefore, has constructed for this purpose a pair of adenotomes, one for the right and one for the left side. The fenestre is small (12 mm.) and long (30 mm.) and bent upward in a right angle so that the ascending part is 23 mm. high. Furthermore, the upper part of the handle is bent sideways in an obtuse angle (about 165°) so that the knife easily enters into the lateral furrow of the naso-pharynx. By means of this knife the lateral vegetations are easily removed by one cut, and experience teaches that the tubal lips are in no way injured thereby.

John Fred. Fischer.

A Factor in the Etiology of Distorted Nasal Septa.

CHARLES E. QUIMBY, New York. (*The Medical News*, March 12, 1904.) Dr. Quimby thinks that deflected and distorted septa are in many cases developmental defects and require no other cause for their explanation than pure chance. In some cases the superior maxillary bones unite at an unduly acute angle, while the vomer and triangular cartilage, one or both, fail of proper articulation with the

maxillary, palate and ethmoid bones. From this point the production of deflected and distorted septa is merely a question of mechanics.

A case is related in which a young girl of 11 years of age, previously a nose breather, developed a tendency to mouth breathing. Examination showed a decided deflection of the cartilaginous septum with general hyperemia and swelling of the membranes. The left plate of the vomer was bent sharply outward posteriorly and was not in articulation with the palate bones in the central line. There was nothing abnormal in the pharynx. Local treatment accomplished nothing. Her teeth were triangular and had come in very irregularly, while the two lateral incisors had their inner edges rotated backward and the whole tooth carried inward until it was overlapped by the central incisor fully one-half its width. With the aid of a band and a small jack-screw, the central incisors were separated a little over an eighth of an inch, while the teeth under pressure had not been obviously moved in the bone. All tendency to mouth breathing soon disappeared, and an examination showed marked decrease in the deflection of the cartilage but no appreciable change in the vomer. Condition of perfect respiration has continued for three years. The author regards the bending of the septum as due to imperfect articulation and undue vertical pressure from the developing maxillary bones, and that this pressure was relieved by separation of the maxillae and that the cartilage was pressed into the groove thus formed. He thinks that irregular teeth, high palatine, or narrow alveolar arch and distorted nasal septum should be treated by the dentist and rhinologist together.

Further observation and work along this line seem to be in order.

Richards.

III.—MOUTH AND PHARYNX.

The Recognition and Treatment of Some of the Pharyngeal Lesions of Syphilis.

LEWIS S. SOMERS, Philadelphia. (*The Medical News*, March 12, 1904.) The author has found in the erythematous stage that mercury is essential and prefers the protiodide in one-quarter to one-third grain doses two or three times daily, together with an astringent gargle of rhus

gla ra. For the mucous patch he uses the same form of mercury, together with an occasional application of 20 to 50 per cent. solution of nitrate of silver. In some cases, however, the silver salt is of no material aid. He then uses chromic acid applied locally by moistening a few crystals on the end of an application tightly wound with cotton. In the mucous patch seen well on during the early tertiary stage of syphilis, mercury is often of no benefit; on the contrary, occasionally aggravates the condition. Three to five-grain doses of potassium iodide will usually produce marked relief. For the tertiary stage where the syphilitic ulceration is marked and the tissues frequently break down within a few hours, the destructive process is to be checked in the very shortest time possible. He begins with iodide of potash in 15 to 20 grain doses three times daily, increasing the amount by five-grain doses until a favorable action upon the syphilitic process is observed or tolerance has been reached. One, two, or three hundred grains daily may be necessary, and the amount used must depend entirely upon the result obtained. Mercury in the form of bichloride or protiodide is also to be administered, and in severe cases should be given by hypodermic injection or inunction. Necrosed bone is to be removed when it has separated from the surrounding tissues.

Richards.

IV.—LARYNX.

Partial Extirpation of the Larynx for Carcinoma.

GEORGE F. COTT, Buffalo, N. Y. (*The Jour. Amer. Med. Assn.*, December 5, 1903.) There was a large growth involving the entire left lateral thyroid cartilage with infiltration of the right arytenoid, portion of which examined microscopically showed it to be carcinoma. Incision was made three inches in length, the thyroid cartilage separated from its attachment, larynx opened. On opening it was found that only one side was apparently affected, so that only the left thyroid and left cricoid were removed. Tracheal tube inserted. No glandular structures found enlarged. Tracheal tube had to be worn but the recovery was speedy, patient walking about in three days. Four months after operation

there was difficulty in swallowing, together with the formation of a large swelling in the neck and apparently secondary infection of the carcinomatous process. Treatment with the x-rays caused another disappearance after eleven treatments, and on May 1, 1903, case is reported as entirely well.

Through the courtesy of Dr. Cott, the reviewer had an opportunity of seeing this patient on April 1, 1904, eleven months after the time referred to in the paper, and there had apparently been no further recurrence of the growth. By putting the finger over the tracheotomy opening the patient could speak very comfortably.

Richards.

V.—MISCELLANEOUS.

Preliminary Communication on the Treatment of Lupus of the Upper Air Passages by Radium.

DR. V. DELSANS. (*La Presse Oto-laryngologique Belge*, No. 81.)

The author is one of the first who studied the influence of radium rays on lupus of the mucous membrane. He uses 20 milligr of radium, 6 radium (250 frcs.) enclosed in a small thin glass bottle fixing it for the larynx on the end of a flexible handle and on a straight one for the nose and the pharynx. Beginning with one minute he gradually increased to four minutes daily. He finds early that there is anemia of the mucous membrane and that the patients are subjected to a slight feeling of constriction, followed by a cold sensation behind the sternum. In one case of lupus of the larynx he saw several hours after the sixth session, edematous swelling of the epiglottis and redness of the vocal cords, causing the patient some trouble in swallowing and breathing. This soon disappeared, however, upon the external application of cold. He thinks the improvement he gets by radium, much greater than by any other agent used now.

Beside lupus, he treated cases of ozena and tuberculosis laryngitis. These cases, however, are still of too recent date to permit any conclusion. He proposes to call the treatment with the radium X-rays, radium therapy, contrary to the

X-rays of the radiotherapy. Finally he gives the literature on the subject. *Meyjes.*

Lupus of the Respiratory Mucous Membrane, and the Treatment Carried Out in Finsen's Medical Light Institute.

HANS. B. CHRISTIANSEN. (*Ugeskrift for Lager*, No 23, 1903.) Among about 1,000 lupus patients treated in the last 6 years at the light institute, $3/4$ showed unmistakable signs of lupus of the mucous membrane. The disease localizes itself, by predilection, just within the external junction of the respiratory passages, most frequently in the anterior part of the nasal cavity, partially on the septum, partially on the side of the vestibulum nasi, at the anterior end of the concha intima, next often on the lips and superior gums.

The mucous membrane lupus usually demands a very energetic local treatment. In the institute, the treatment is carried out everywhere where the differently formed lenses can be brought, and where the light can be continually directed. This is possible at the anterior part of the gingiva labialis, the anterior portion of the vestibulum nasi, and the tongue. The light treatment cannot be used in the more hidden mucous membranes. The treatment takes place in seances of the same length as in skin lupus, and the result is almost as favorable as in skin lupus.

In places where the light treatment cannot be used, the galvanocaustic is the main remedy. The lupus nodules are destroyed and the needle is not put in the healthy tissue. The disinfectants used were iodine and sublimate, the latter in solution of 10 per cent. for nasal tamponade. The carrying out of the treatment daily and for a long time is of the greatest importance. For home treatment, tamponing the nose with sublimate, and diligent cleansing the mouth.

John Fred. Fischer.

A Study of Normal and Pathological Conditions of the Bursae of the Neck. With Special Reference to the Subhyoid Bursa.

WILLIS S. ANDERSON, Detroit. Michigan. (*The American Journal of the Medical Sciences*, March, 1904.)

The anatomy of the bursae of the neck is considered in detail, together with the formation of cysts in these bursae. The subjective symptoms which cysts in these bursae produce are comparatively few. They develop slowly and are not painful or tender to the touch, varying in size from a slight swelling to that of an orange, but usually that of a hazel-nut. They are found just below the hyoid bone in the median line, or just to one side, firmly attached to the underlying tissue, but the skin over them is movable. Fluctuation is or is not present according to the character of the contents. They may remain for years not appreciably changing in size; may disappear spontaneously; (this is rare) may spontaneously open, or open as the result of local treatment, and leave a chronically discharging sinus, or may become infected and form an abscess.

The writer relates two cases of his own and refers to those found in literature. His first case was a girl aged 12. The tumor was about the size of a marble, moved with the hyoid bone but did not seem to be attached to the body of this bone; seemed to be of a cystic nature; no evidence of inflammation. Operative treatment being declined, at the end of a year tumor was found to have completely disappeared.

Second case in a woman aged 43. Swelling about the size of a large marble, cystic in character, thought to be due to the pressure of a high collar. No constitutional symptoms. Tumor decreased in size, then increased, again diminished, but never entirely disappeared. He does not think that the internal use of diuretics, iodides, mercurials, or other absorbents have any beneficial effect in bursal affections. Simple incision with drainage is of no avail. Drainage of the sac and use of local irritants may be successful or may cause failure. The difficulty is to get the local irritant in contact with all parts of the sac. Complete extirpation of the cyst is the most satisfactory method of treatment. Weir injected the sac with melted paraffin, allowed it to harden, and then dissected out the sac entire. This method deserves further trial.

Richards.

Catarrh and Predisposition,

B. M. BEHRENS, Minneapolis. (*Northwestern Lan-*

cel, January 1, 1904.) The author regards the pathogenesis of most functional and pathological affections of the upper respiratory tract, eye and ear, to be pathologically very nearly the same thing, namely: a reflex vasomotor paresis. He has found that cauterization of tender spots in the nose, after thorough application of cocaine and adrenalin, will cure very many of the cases of so-called catarrh, and that the retrograde changes in the mucosa of the throat and nose are the result of irritations in the nose. He is even inclined to regard pneumonia as a reflex disorder rather than primarily a bacterial disease.

Richards.

The Rational Treatment for Mouthbreathing.

W. H. FITZGERALD, Hartford, Conn. (*Medical Record*, September 5, 1903.) The author is opposed to the use of the spray, douche and solution treatment, regarding them as contrary to nature and never to be practiced. They are often excitants, not only to the nose but to the accessory cavities and ear. Nose breathing, in the absence of anatomical causes preventing it, can be brought about through practice. At night he uses a mouth guard consisting of a small strip of adhesive plaster (zinc oxide) worn vertically across the center of the mouth, and during the daytime has the patient breathe forcibly through his nostril at the rate of one respiration per second for ten seconds and this exercise repeated eight or ten times during the day. A permanent patency of the Eustachian tube can be brought about by nasal breathing, while the Eustachian catheter is often harmful, acting as a mechanical irritant, and thus assisting the progress of an already thickened and, perhaps, irritable membrane.

Richards.

Treatment of Cervical Adenitis Due to Tonsillar Infection.

ALBERT E. ROGERS, Boston. (*Medical Record*, November 28, 1903.) The author thinks that many cases of cervical adenitis have their origin in infection through the lymphatics from the tonsils and that cervical adenitis in children and young adults is commonly associated with hypertrophy of either the faucial or pharyngeal tonsil.

He suggests that in all cases where the cervical glands are not already broken down the tonsils be removed before resorting to an incision through the skin, and he appends the histories of five such cases, in all of which, after thorough extirpation of the tonsils under ether, the enlarged glands in the neck disappeared in periods of a few weeks to six months.

Richards.

Intratracheal Injections: Experimental and Clinical Study of Their Value in Diseases of the Lungs.

WILLIS S. ANDERSON, Detroit, Mich. (*The Journal of the Michigan State Medical Society*, March, 1904.) The author finds that considerable quantity of water or olive oil can be absorbed from the bronchi and trachea without irritation, and has for several years been in the habit of treating pulmonary cases locally through the medium of olive oil as a vehicle for the administration of remedies. He has used the various essential oils, iodine, iodoform, guaiacol, menthol, and many others, and finds that the drugs are less irritating than when water is used as a medium, and the absorption of the oil adds so much nutriment to the body. Sedatives can also be used in the same way.

This treatment is used for simple bronchial as well as for the more severe tubercular affections. The solution should be warmed to body temperature before the injection is made.

Cases illustrating the value of this treatment are referred to. *Richards.*

Esophageal Obstruction Caused by Swallowing the Upper Alveolar Plate.

GEORGE F. COTT, Buffalo, N. Y. (*The Journal of the American Medical Association*, December 5, 1903.) The plate was swallowed during eating; was located by means of the x-ray; found immediately behind the sternal notch. The center of the plate was two and one-quarter inches below the thyroid cartilage. The incision was made on the outer side of the trachea, the tissue separated between the muscles and carotid sheath until the esophagus was located. It was opened, the plate grasped with forceps, carefully rotated, and removed. The wound was sutured and the rest of the cavity packed with gauze. The wound closed at the end of nine days, during which time no food was allowed to pass down the esophagus, the patient being nourished entirely by the rectum. *Richards.*

The Effect of Erysipelas upon Atrophic Rhinitis: with Report of Case.

LEWIS S. SOMERS, Philadelphia. (*The Medical News*, August 29, 1903.) The author reports a case of severe and very troublesome atrophic rhinitis which was very much improved and practically cured following and apparently the result of, an attack of facial erysipelas lasting about two weeks. The improvement has continued. Two somewhat similar cases of Francesco are also referred to. *Richards.*

BOOK REVIEWS.

NOSE AND THROAT FOR THE GENERAL PRACTITIONER. By George L. Richards, M. D., Fellow American Laryngological, Rhinological and Otological Society; Fellow American Otological Society; Associate Editor *Annals of Otology, Laryngology and Rhinology*; Otologist and Laryngologist Fall River Union Hospital, Fall River, Mass. Price \$2.00. Published by INTERNATIONAL JOURNAL OF SURGERY Co., N. Y.

Most books upon special subjects in medicine purporting to be written for the general practitioner fall short of the mark or overreach the point of view of the general practitioner. The writer, as a rule, will dwell upon subjects which are of great interest to him, but with which the practitioner has little or nothing to do; and on the other hand he takes for granted many things which the practitioner has really had no opportunity of learning. Dr. Richards, in his little book, seems to have struck the happy medium, in that every department of the subject is presented in a way tangible to the general practitioner without being too elemental. Upon these grounds the book is to be heartily recommended. Dr. Richards has utilized his immense clinical experience in a way that brings the whole subject clearly and understandingly to the readers of his book.

ESSENTIALS OF DISEASES OF THE EAR. Arranged in the form of Questions and Answers. By E. B. Gleason, S. B., M. D., Clinical Professor of Otology, Medico-Chirurgical College, Philadelphia; Surgeon in Charge of the Nose, Throat and Ear Department of the Northern Dispensary, Philadelphia; One of the Laryngologists of the Philadelphia Hospital. Third edition, thoroughly revised. W. B. Saunders & Co., Philadelphia and London.

This eminently practical little book will be found of considerable service by students and practitioners in medicine. The questions are pertinent and the answers clear and logical.

ERRATA.

In the September number of the ANNALS OF OTOTOLOGY, RHINOLOGY AND LARYNGOLOGY for 1903 on Page 531, you quote me as saying, "About 57 per cent. of all cases of brain abscess were otitic in origin." This is an error made by the stenographer; what I *did* say was, "About 37 per cent. of all cases of brain abscess were otitic in origin." Also on page 533 of the same number you quote me as saying, "Pilocarpine should be administered hypodermically in full doses for a week or more. This is another error of the stenographer; what I did say was, "In administering pilocarpine hypodermically, it should be given in full doses 6 weeks, 2 months or more."

Will you kindly correct these errors in your next issue and oblige

Yours very sincerely,

JAMES F. MCKERNON.

